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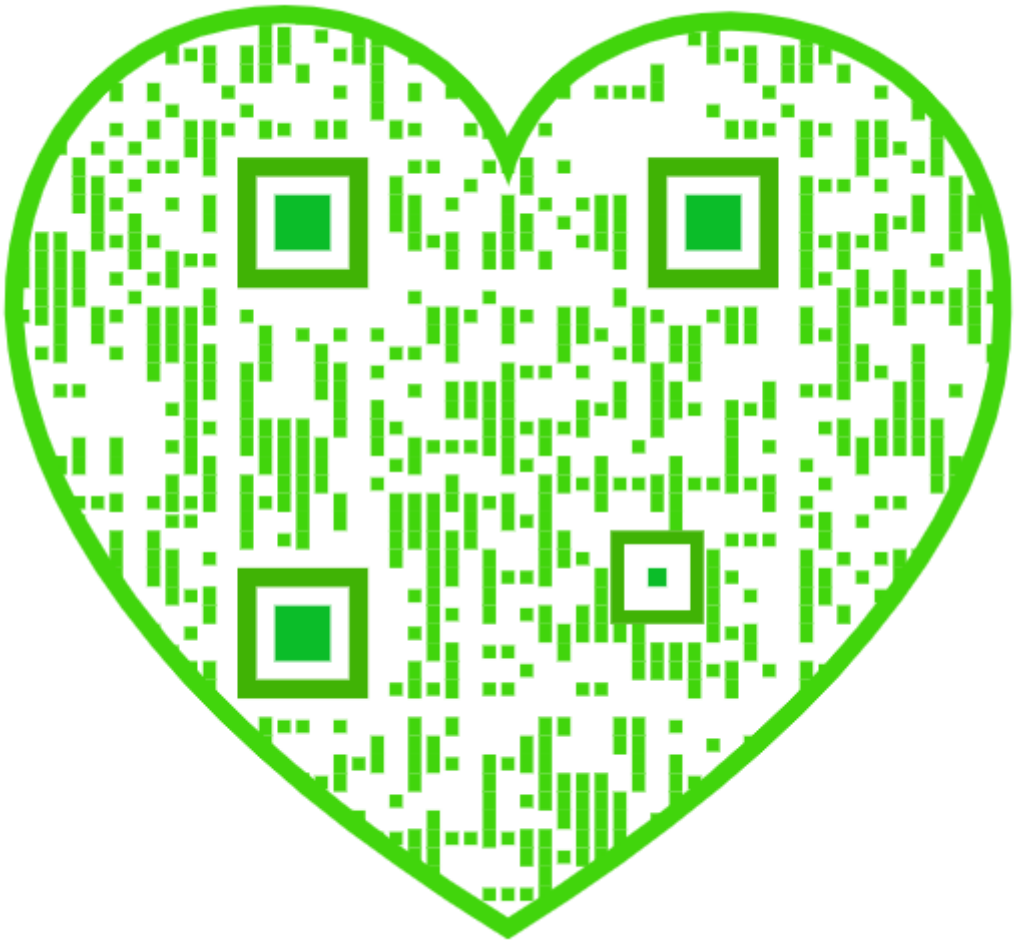

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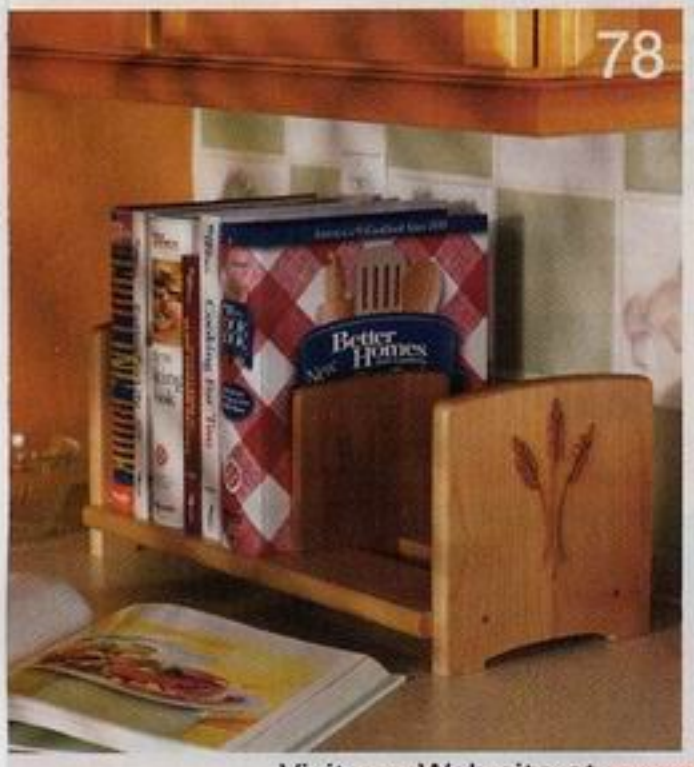

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take off the tarnish

A few pennies' worth of cleaners takes dull-looking metal back to its glory days.

When you restore furniture, you often encounter metal knobs, pulls, backplates, and hinges that are coated with tarnish or paint. Fortunately, you quickly can make them brighter and more attractive with the inexpensive techniques shown here. If a piece is very old and you believe it might be especially valuable, check with an antiques expert before cleaning.

1

2

3

4

1 Determine if it's plated. A piece of hardware that looks like solid brass could be brass-plated steel. Find out with a magnet, which won't stick to solid brass. Clean brass-plated steel with the same steps outlined *below* for solid brass, but don't rub any harder than necessary. You don't want to remove the thin layer of brass.

2 Strip away paint. Use a heavy-bodied paint and varnish remover, applied with a throwaway brush, to take the paint off metal hardware. However, be aware that some strippers also remove brass plating. Scrub stubborn spots with a stiff nylon bristle brush. Work in a metal tray to contain the chemicals and dissolved paint, and dispose of the residue properly.

3 Buff it to beauty. Charge a cloth buffing wheel with tripoli compound to clean smooth solid-brass items in a jiffy. You can order the Dico brand shown here from Woodcraft. Call 800/225-1153 to order item number 08F81, a 3.5-ounce stick, for $5.50. However, hard-to-reach spots and fine details call for extra help. Soak the piece with citric acid, as described *below*, and then scrub the surface with a rag or a nylon or soft brass brush, plus automotive rubbing compound.

4 Take away the tarnish. You can move right into the cleaning process, or make it easier by soaking the hardware for an hour in vinegar or any food product containing citric acid. Lemon juice or ketchup will do the trick. The stronger hydrochloric acid found in toilet bowl cleaner accelerates the process, but follow the safety procedures recommended on the label.

5 Add a protective coat. When you finish cleaning the hardware, wipe away any residue with lacquer thinner. Then protect the shine by spraying on a lacquer that's made to bond with metal. One example is Staybrite, available in a 6-ounce spray can from Van Dyke's Restorers for $7.89, plus shipping and handling. Call 800/558-1234, and request item no. 02012466.

low-tech solutions for

hard-to-sand spots

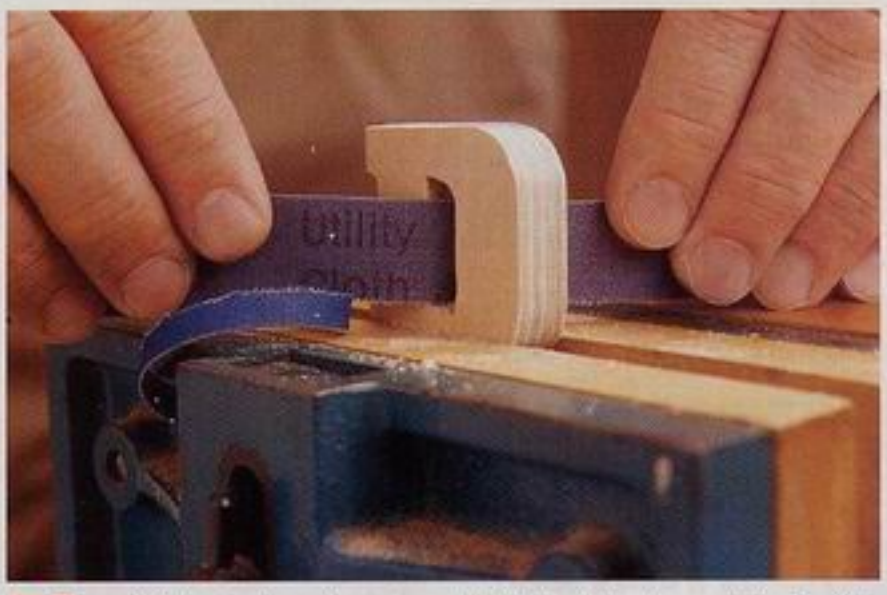
Got nicks in your nooks? Facing a cranny crisis? Take a look at these simple sander stand-ins.

It's great to have a full array of electric sanders—pad, random-orbit, belt—to call into action. But all of that power doesn't do you much good when you find rough spots between the spindles of a chair back, around the flowing edge of a carving, or in any tight spot where most machines just won't fit. Instead of power, you need finesse.

The techniques shown here should solve those problems. Also keep these suggestions in mind:

- Resist the temptation to use miniature, electric rotary tools. They're great for shaping, but not so good for smoothing.
- Tough-to-sand nooks and crannies will be less troublesome if you carefully sand all of the exposed surfaces before you assemble the piece. Check your work by holding each piece at an angle to a light source. As the light slants across the surface, it highlights milling marks and other imperfections.
- Apply finish to potentially troublesome pieces before assembly, whenever possible. You'll avoid globs and runs in spots that are hard to reach.

You can reach lots of hard-to-sand spots with a simple sanding stick. Bandsaw its thickness to a wedge shape for flexibility, and then form a point so it fits into the tiniest nook. Apply self-adhesive sandpaper to the end, a different grit on each side if you choose, and trim the sandpaper to shape with a utility knife.



Use cloth-backed sandpaper, available in strips, to work the inside edges of narrow openings. It won't rip in use, as paper will, but you can tear it to fit the job, as we did here. We're using a 3M strip. For presized widths in a variety of grits, see the Klingspor's Woodworking Shop catalog, available free at 800/228-0000.

When it's too late for another trip across the router table, take down high spots with rubber profiles, wrapped with sandpaper. Choose from convex and concave shapes of various diameters, or an assortment of angles. Klingspor carries a range of "Tadpole Contour Sander" sets for $3.95 apiece.

continued on page 12

low-tech solutions for hard-to-sand spots *continued from page 10*

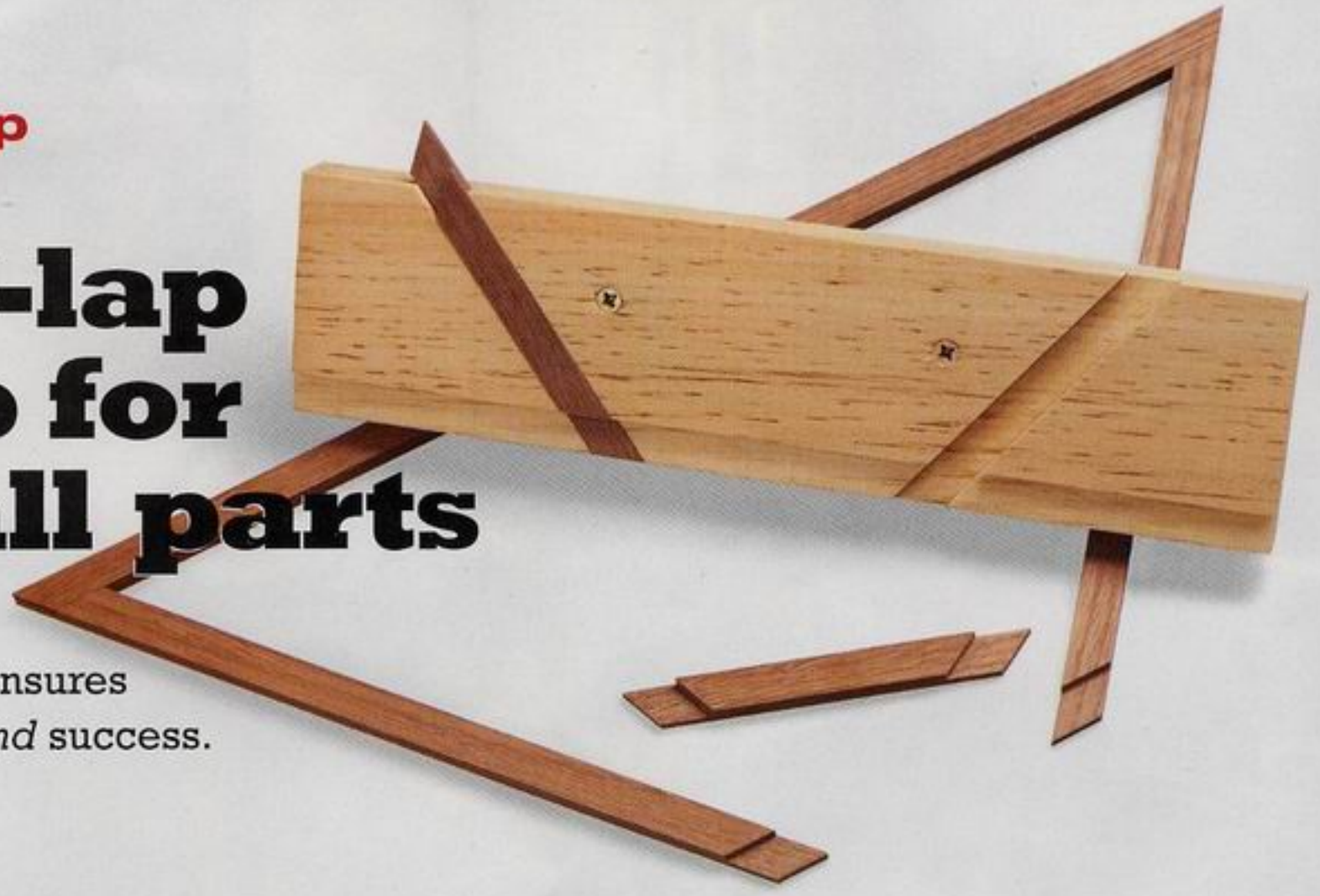
Abrasive cords and tapes help you smooth tiny details in scrollsawn work or on spindles. We're using a cord .052" in diameter to clean old finish from this chair leg. The E.C. Mitchell Company makes cords as small as .012" in diameter and tapes as wide as ¼". Check the Klingspor catalog mentioned on *page 10*.

You can turn a putty knife into a scraper, customized to fit any confined area. This Red Devil tool cost only $2.99 at a True Value Hardware store. Grind it to the needed width or shape with a standard grinding wheel. Remove any burr with a file, and draw a burnishing tool—or the shank of a screwdriver or chisel—along the edge to form a slight hook.

You'll find a needle file to suit any miniature curve or crevice, and you can get a wide variety in one set. Shown here are half of the 12 files included in part number 16H10 in the Woodcraft catalog, priced at $32.99. Call 800/225-1153. These tools work slowly, but excel in the final smoothing step.

Sanding and filing are the best ways to handle most rough areas, but sometimes you'll be able to burnish the spot flat by rubbing it with hard steel. "Dental picks" work well in crannies, such as this one. We bought a set of three picks, including this hooked model, for $7.39 at our local True Value Hardware store.

half-lap help for small parts



A simple jig ensures safety *and* success.

Lightweight, sturdy frames, such as the ones that make up the lampshade on *page 58* or the candle lantern on *page 66*, call for finely crafted half-lap joints in thin stock. Whether the frame parts form a trapezoid, a rectangle, or other shape, placing them in a simple jig makes the cutting easy and safe.

Build the jig

Cut scrap stock for the jig's base and handle, as dimensioned on **Drawing 1**. Install a dado blade in your tablesaw sized to the width of the frame stock, and raise it to cut a groove equal in depth to the stock's thickness. For a trapezoidal frame, such as the ones that make up the lampshade, cut a pair of angled dadoes across the base, where shown. (To accurately set your miter gauge, see the **Shop Tip**, *right*.) The angled dadoes allow you to make opposing-angle half laps on the ends of parts, such as the lampshade's top and bottom rails. For a rectangular frame, such as the ones used in the candle lantern, cut a single dado straight across the base. Hold off cutting the rabbet. You'll do that during the jig's first use. Clamp the handle to the base, drill pilot and countersunk shank holes, and drive the screws.

Prepare the frame stock

Plane stock (¾×4×24" for the lampshade) to a thickness that matches the width listed for the frame members (½" for the lampshade). The stock should be about 1" longer than the longest frame member. As you approach final thickness, check the stock's fit in your jig's dado(es). It's important that the stock fits snugly. From the edge of this planed stock, rip strips 1/16" thicker than the thickness listed for the frame parts. (Rip extra strips for test-fitting purposes and in case of a cutting error.) Plane both faces of the strips until they fit in the jig's dado(es) flush with its bottom.

Cut the parts to size

Install a zero-clearance insert in your tablesaw. Now, attach an auxiliary extension to the miter gauge, positioned so the blade will cut through it. Set the miter gauge to the required angle (39° for the lampshade, 90° for the candle lantern), and cut the pieces to the listed lengths for the project. When cutting the lampshade parts, you'll have to adjust

SHOP TIP

How to easily set precise angles

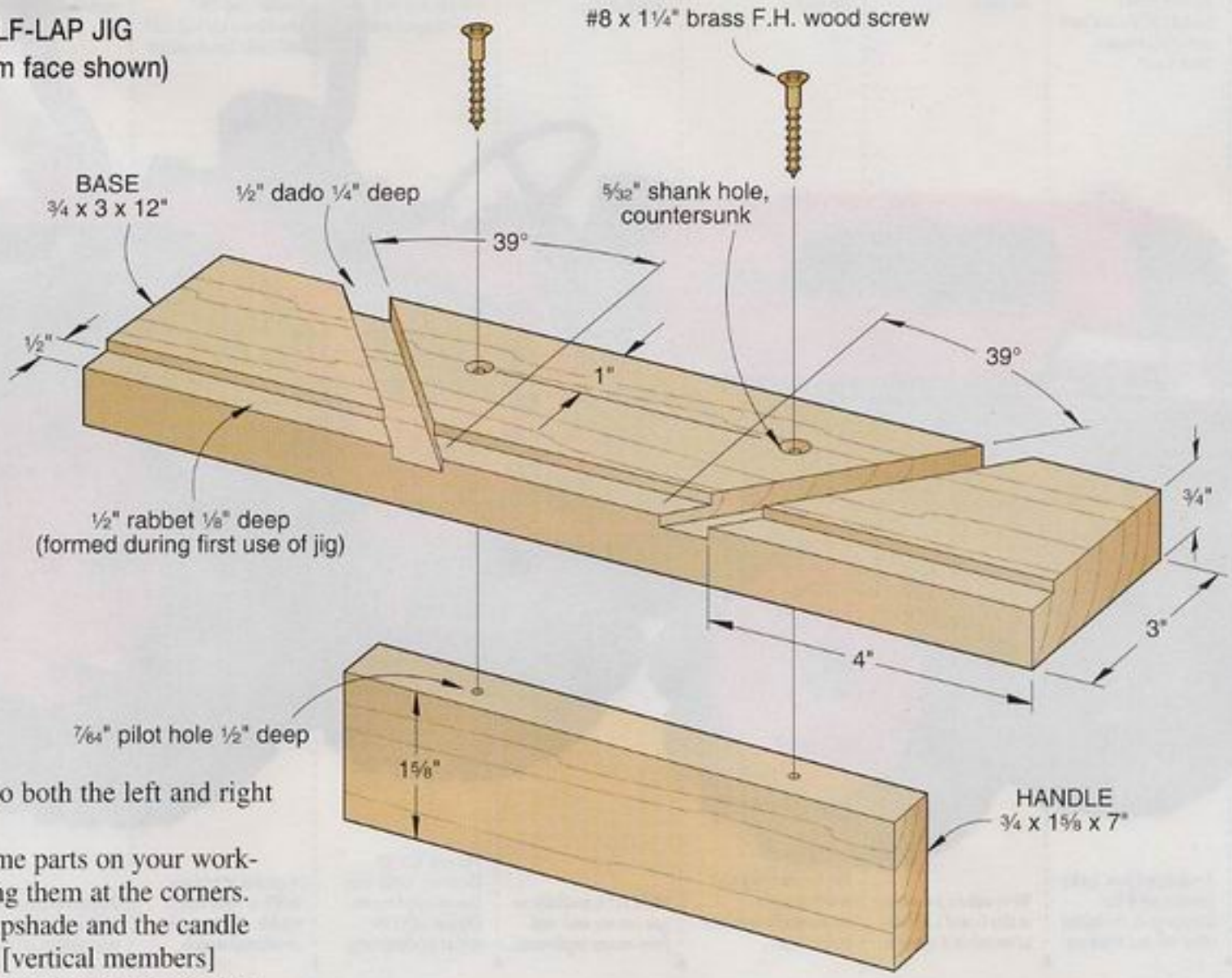
When you need to make dead-accurate miter cuts, relying on your saw's miter gauge for precision can be iffy. To ensure an exact setting, use an adjustable triangle to position the miter gauge. To do this, align one side of the triangle with the miter bar slot, as shown. The saw blade must be parallel to the slot, so check your blade's alignment. (Your saw's owner's manual should show you how.)

Some woodworkers prefer to place the triangle against the saw blade. This works, too, provided the triangle fits flat against the blade's plate. But some blades' tooth profiles make this impossible to do.

You can set adjustable triangles accurately to within ½°. Find them at art and office supply stores, where they sell for $15-$20.

Continued on page 16

1 HALF-LAP JIG
(Bottom face shown)



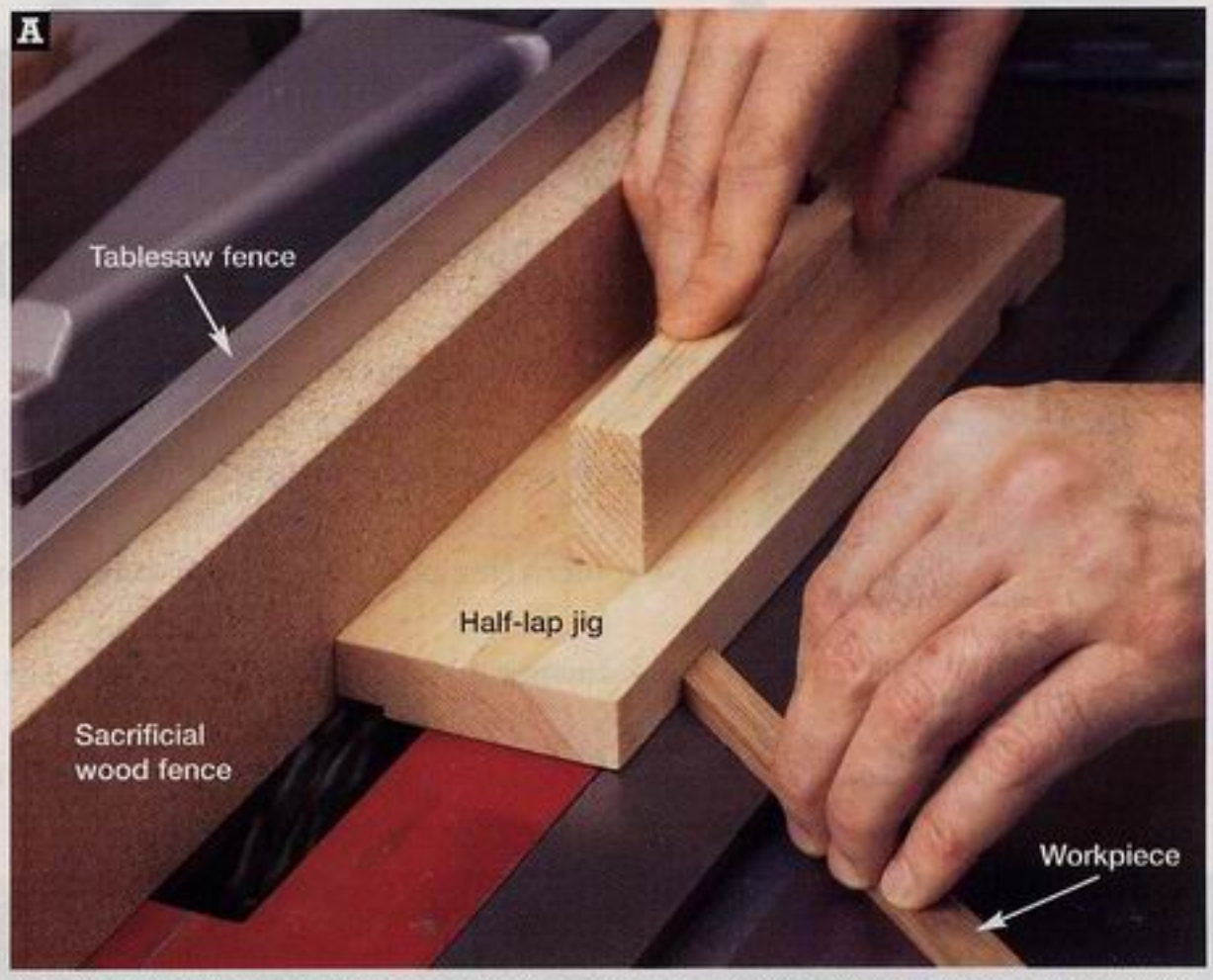
the miter gauge to both the left and right of center.

Lay out the frame parts on your workbench, overlapping them at the corners. (For both the lampshade and the candle lantern, the stiles [vertical members] overlay the rails [horizontal members].) Mark the surfaces where you'll cut the half laps—the bottom surfaces at the ends of the stiles, and the top surfaces at the ends of the rails.

Using the jig

Attach a sacrificial wood fence to your tablesaw fence. Position the fence so it just touches the dado blade's side. Set the blade height just shy of one-half the thickness of your parts. Using your miter gauge for support, cut a half lap on an end of two of your spare strips. Overlap the pieces, and check for a flush fit. If necessary, adjust the blade height and retest.

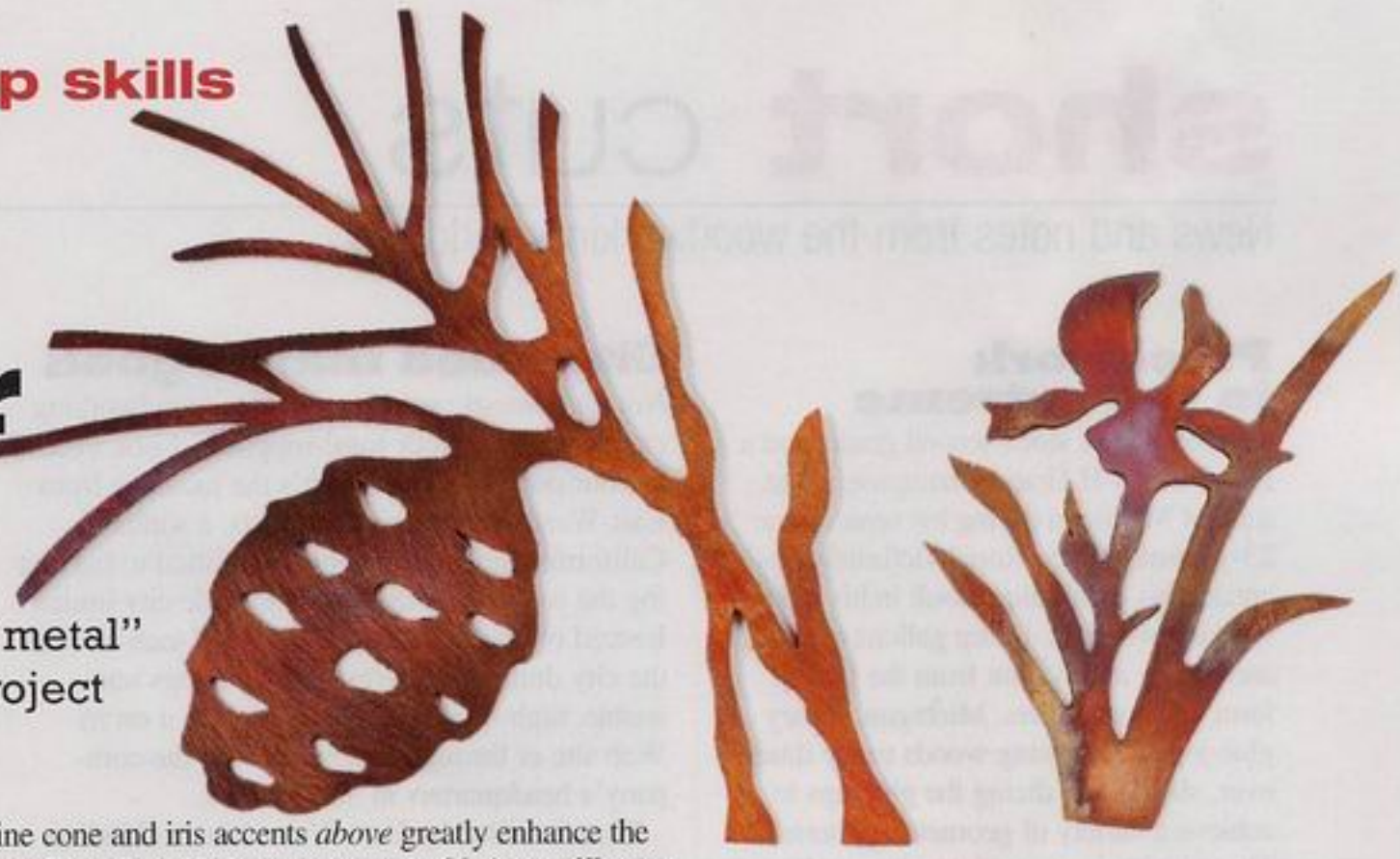
When you're satisfied with the fit, place a frame part in the jig with the marked surface visible. Align the end to be cut with the jig's fence-side edge. For a part with parallel-angled ends, such as the lampshade's stiles, use the same dado to cut each end of the same piece. For a part that has oblique-angled ends, such as the lampshade's top and bottom rails, use both angled dadoes to cut the half laps in each piece. See **Photo A**. Repeat as needed for the remaining parts.



Keeping the jig and part pressed flush against the sacrificial wood fence, pass the jig across the dado blade to form the half lap in the end of the workpiece.

develop your **shop skills**

Create copper motifs



Here's an easy way to "metal" with a woodworking project and add to its styling.

Take a minute to see how the pine cone and iris accents *above* greatly enhance the appeal of the table lamp on *page 58* and candle lantern on *page 66*. As you'll soon discover, there's no mystery to making them. For materials, you will need 24-gauge sheet copper, available at home centers, or hardware, crafts, and hobby stores. You'll also need a paper pattern (like those in our *WOOD PATTERNS*® insert), spray adhesive, ⅛" hardboard scrap, and the simple three-step process described *below*.

Find the full-size patterns in the *WOOD PATTERNS* insert.

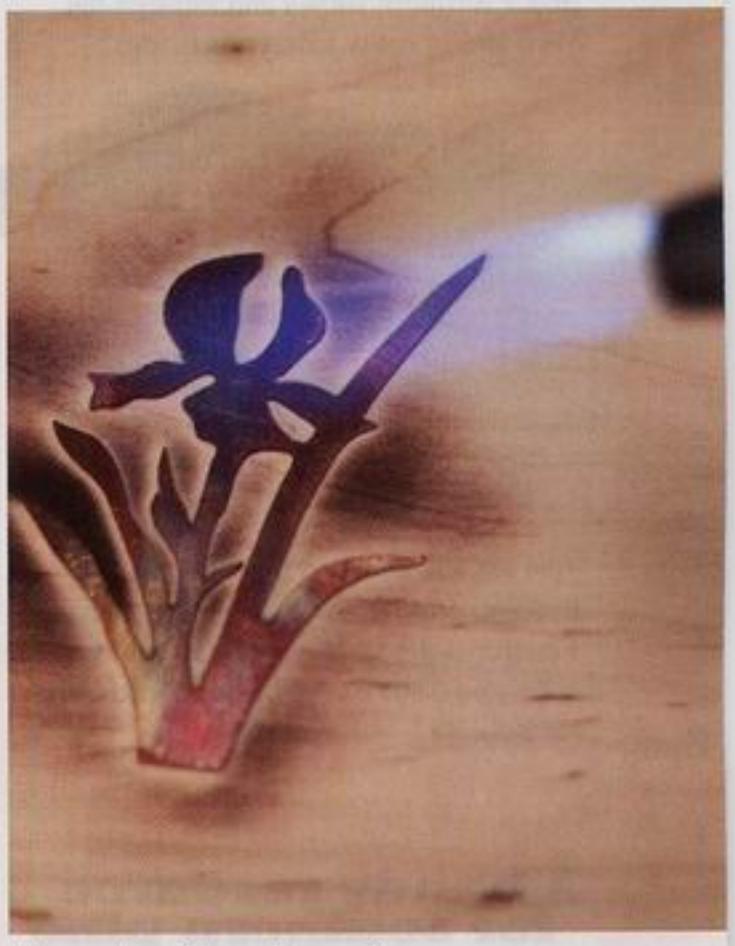
Cut the pattern

1 Rough-cut three pieces of ⅛" hardboard and two pieces of sheet copper to slightly larger than the paper pattern you wish to duplicate in copper. Using spray adhesive, make a sandwich blank, bonding together the five pieces, placing the copper where shown in the photo. Adhere the pattern to the sandwich top. Now, drill any needed blade start holes through the pattern for inside cuts, and scrollsaw the pattern to shape using a no. 2 blade (20 teeth per inch) at high speed.

Note: *If you need only one motif, go with two pieces of hardboard and one piece of copper. For quality control, avoid scrollsawing more than two pieces of copper in this manner at the same time.*

Sand the burrs

2 Carefully pry apart the scrollsawn sandwich, wipe off the adhesive from the copper motif with paint thinner, and rinse with water. Next, place the motif on a flat surface, and, with a sanding block and 220-grit sandpaper, sand the copper surface, removing any burrs along the edges of the piece.



Apply the heat

3 Place a piece of scrap copper on scrapwood. Using a propane torch on a low setting, apply heat to the copper, keeping the nozzle about three inches from the surface. Move the flame back and forth to avoid scorching. What you want is a pinkish orange coloration like that in the motifs at the *top of the page*. Once you feel confident with the process, try flaming your motif, as seen *above*.

short cuts

News and notes from the woodworking world

Piecework in the extreme

A woodworker since second grade, and a First Place 4-H Grand Champion in the state of Michigan during his senior year, 23-year-old Jamey Rouch definitely has created his own unique look in his woodworking wonders. Using gallons of glue, and cherry and walnut from the family farm in Three Rivers, Michigan, Jamey glue-joins contrasting woods many times over, slicing and dicing the glue-ups to achieve a variety of geometric patterns. These he incorporates into any number of project designs, from simple platters and cutting boards to massive executive desks, coffee tables, and pool tables. Traveling the country, he currently sells his work at major furniture shows and through his Web site at www.jameyrouch.com.

This full-size sculpted pool table by budding professional woodworker Jamey Rouch weighs 1,500 pounds, includes an estimated 6,500 pieces of wood, and sells for $29,000.

A handy resource for Southern pine

Want to know more on the changes in the pressure-treated lumber industry? Looking for a few tips on dealing with wood mold or moisture problems? Get help from the Southern Pine Council. Its new Web site at www.southernpine.com provides valuable information on the use, installation, and handling of Southern yellow pine.

City wood makes good

Not all domestic woods suited for woodworking can be found at your local suppliers. Look instead in your own backyard. That's the message from East-West Urban Forest Products, a southern California lumber company committed to harvesting the wood from trees found inside city limits. Instead of transporting the trunks of such trees to the city dump, East-West mills the logs into usable, high-quality lumber and sells it on its Web site or through appointment at the company's headquarters in San Marcos.

Woods milled by East-West include Carolina cherry, black acacia, Red River gum, sycamore, silver maple, and holly oak—to name a few. For example, craftsman Dan Gindling used quarter-sawn sycamore and walnut to fashion the CD cabinet, *right*. For more information, or to purchase milled urban wood, call 866/234-9663, or visit www.eastwestwood.com. If you decide to harvest your own city logs, be sure to scan them for metal before sawing.

Woods harvested within city limits by East-West Urban Forest Products provided the materials for this stylish piece.

Show time for turners

Every June the American Association of Woodturners (AAW) holds its annual symposium, bringing together nearly a thousand members worldwide. In 2002, the event took place in Providence, Rhode Island, and was attended by *WOOD®* magazine projects editor Jan Svec.

Along with the workshops, and a gallery of turned pieces by individuals, one of the more entertaining events is the Chapter Collaborative competition. Here, wood-turning clubs team-design and build unique, complex projects that vie for a spot on the awards platform. This past year, 17 clubs entered the fray, and their turned creations had to fit within a 24×24×34" box. *Below* are the impressive winners. For more information on the AAW, call 651/484-9094, or visit www.woodturner.org.

Winners of the AAW Chapter Collaborative turning competition for 2002 include (from left) "Cookie Tree," Best of Show, Dallas Area Woodturners; "St. Basil's Cathedral," Best Artistic Entry, Central Connecticut Woodturners; and "Rhode Island Capitol Dome," Best Technical Entry, Massachusetts South Shore Woodturners.

Continued on page 20

A classic woody rides again

Recently, our friends at Woodcraft let us know about an impressive accomplishment by one of their regular customers, Dave Westrate of Parkersburg, West Virginia. As a novice woodworker in 1995, Dave took up the task of completely restoring a 1939 Ford station wagon, a bona fide "woody." (See *below*.)

According to Dave, "The car barely worked and the wood body was almost totally consumed by rot, but it didn't matter—I was in love." In all, he spent two years rebuilding the vehicle's mechanical works, and five years replacing the maple and birch plywood panels making up the body's sides and back. Attaboy, Dave.

Crowning achievements

Hats off to Denise Nielsen and George Worthington of Saugerties, New York, for their one-of-a-kind, full-size wooden hats. While Denise provides the inspiration for many of the designs, George looks after the woodworking.

George's approach involves carving the brim, cap, and band separately. Similarly, he fashions the flower petals one at a time, and then glues them together to make the flowers. He sands the pieces with progressively finer sandpapers, polishing the wood with super-fine Micro-Mesh abrasives.

The hat pieces are glued together into the final design, and then finished with Watco Danish Oil to add luster. To see more of Denise and George's work, go to arthats@oilswoodstone.com.

George Worthington's decorative hats feature a variety of woods.

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shop tips

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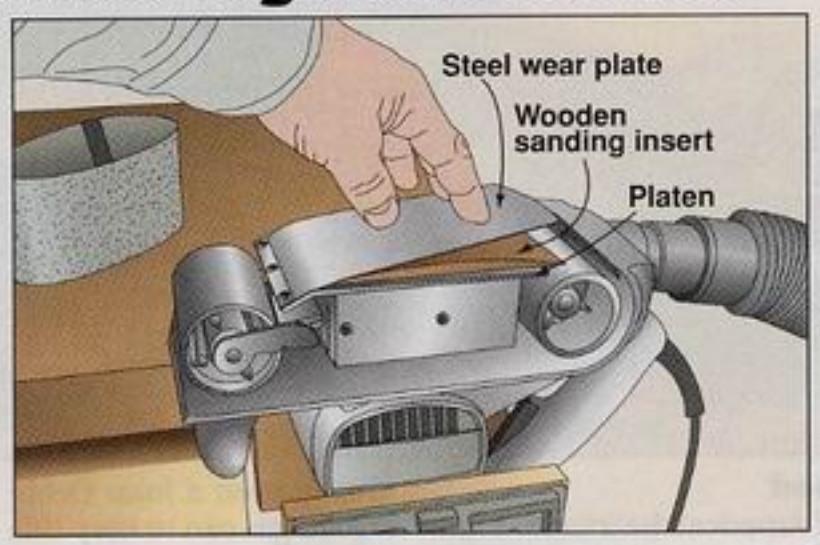
Belt sander smooths graceful curves



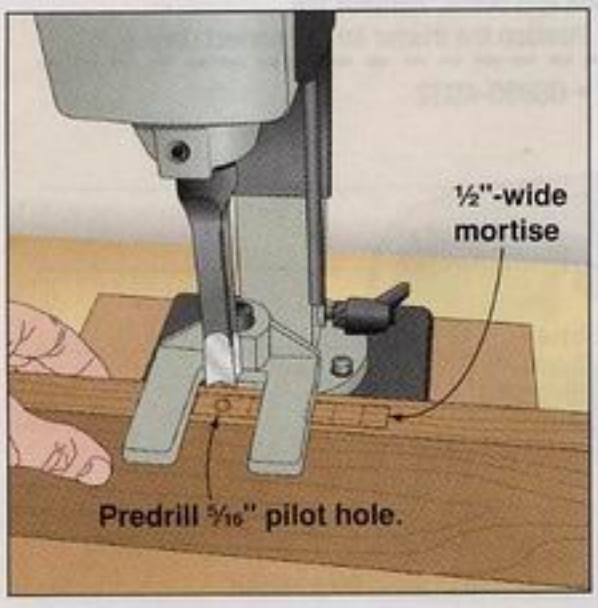
top shop tip

While building a set of dining-room chairs recently, I got frustrated when sanding the long, gentle curves of the back slats. Even with its largest drum installed, my oscillating spindle sander left an unacceptably wavy surface. So I turned instead to my 4×24" belt sander.

Like most belt sanders, mine has a springy steel wear plate between the belt and platen. I bandsawed a curved wooden insert as wide as the belt and as long as the wear plate. (I've successfully used inserts as thick as ⅝" in the middle.) If you try this tip, it's not necessary to match the radius of the insert to the curve of the workpiece; any broad radius will outperform a spindle sander.

After removing the belt from my sander, I fitted the wooden insert between the platen and wear plate, then reinstalled the belt. The plate and belt conformed easily to the shape of the insert. Now, with the sander held firmly upside down in my bench vise, I sanded the broad curves of the back slats. I kept the workpiece moving and occasionally rotated it end for end.

—Mike Maas, Lake Elmo, Minn.



Spare wear and tear on your mortiser

While building a Morris-style chair and ottoman recently, I noticed that my benchtop mortiser required a great deal of force when making its first cut. To avoid overtaxing the machine and chisel, I predrilled the first hole with a drill bit smaller than the mortise, as shown at *left*. Removing just this little bit of material made cutting the first and succeeding cuts effortless, and kept me from overheating the chisel and bit.

—Joseph Amara, Melrose, Mass.

Continued on page 24

our winner

Mike Maas has spent the bulk of his adult life teaching people: first as a high-school shop teacher, and then doing technical instruction for a large electronics company. These days, our Top Shop Tip winner works in the custom training department at Dunwoody College of Technology. Despite his hectic schedule, Mike loves to spend time in his 14×28' basement shop building projects, such as a dining-room set with chairs, including the one shown *above*, that inspired this issue's Top Shop Tip at *left*.

Mike Maas earned a Craftsman Jobsite tablesaw, worth $400, for sending this issue's Top Shop Tip. Way to go, Mike!

You can win a free tool, too!

Describe how you've solved a workshop dilemma, and you'll earn $75 if your tip appears here. And, if it garners Top Shop Tip honors, you'll also win a tool prize worth at least $250.

Send your best tips, along with photos or illustrations and your daytime telephone number, to: **Shop Tips, *WOOD*® Magazine, 1716 Locust St., GA-310, Des Moines, IA 50309-3023**. You can also e-mail tips to **shoptips@woodmagazine.com**, or post them on the Top Shop Tip forum at **www.woodonline.com**.

Because we try to publish only original ideas, please send your tips only to *WOOD* magazine. Sorry, but submitted materials can't be returned.

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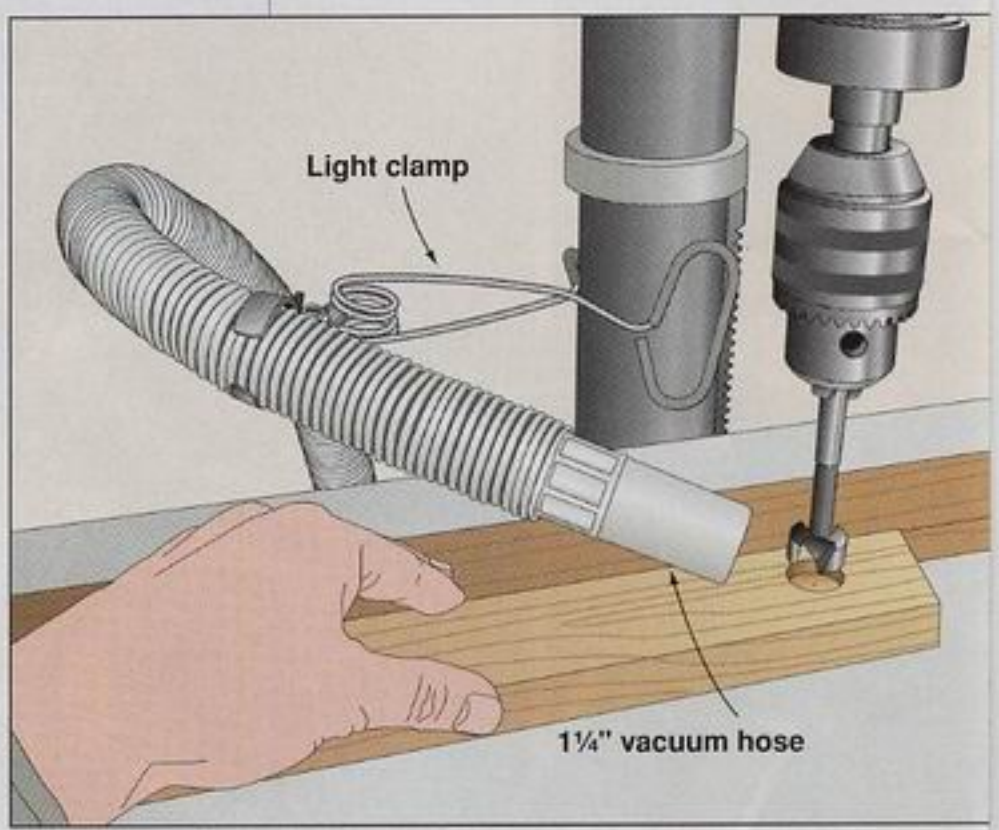
Light clamp puts hose where you need it

Although many power tools now include dust-collection ports, removing debris while boring on a drill press remains a challenge. Here's a simple rig that allows you to position a vacuum hose near the bit, yet easily reposition it when necessary.

Remove the socket and reflector from one of those inexpensive clamp-on work lights, then fit a 1¼" shop-vacuum hose into the clamp where the socket was, as shown at *right*. Now clamp the hose to your drill-press column. By loosening a single wing nut on the clamp, you can swivel the hose to wherever you want it, and lock its position by simply tightening the same nut.

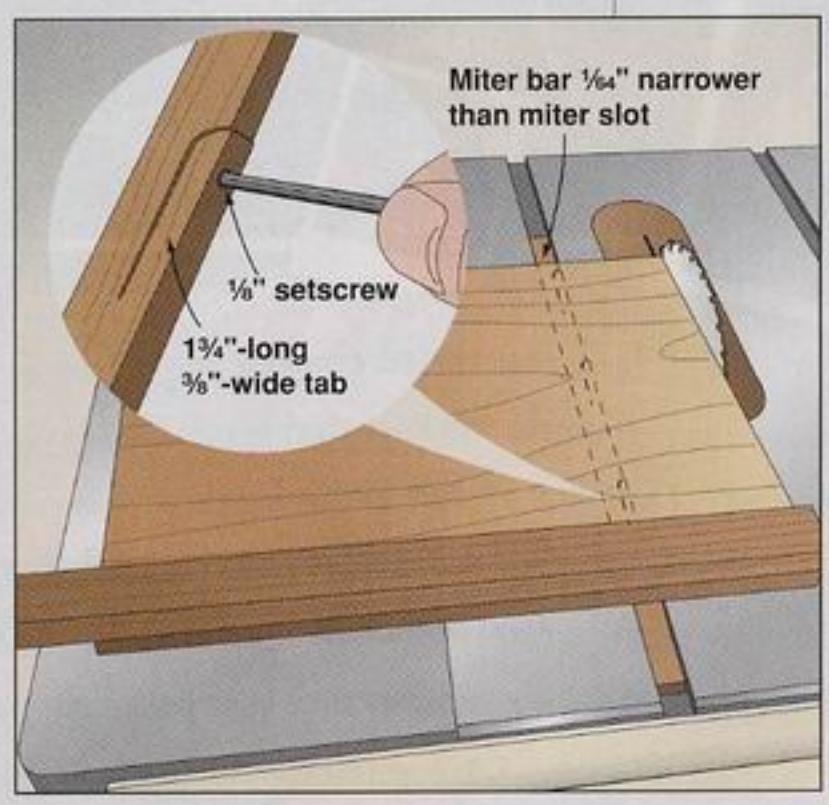
—Ed Bahor, St. Albans, W. Va.



Make an adjustable miter bar

Some tablesaw jigs, such as cutoff sleds, ride in the saw's miter slots, and a well-fitting miter bar keeps these jigs accurate. You can make your own miter bar out of hardwood, but it's tricky to get—and maintain—that good fit. Here's how to make your own adjustable miter bar from wood.

Rip a ⅜"-thick piece of hardwood, preferably hard maple, about 1/64" narrower than your saw's miter slot. (Most are ¾" wide.) Using a scrollsaw or bandsaw, cut three J-shaped kerfs as shown in the drawing, *below left*, then drill a ⅛" hole in each "tab," making sure you don't drill beyond the kerf. Thread a ⅛" setscrew into each hole.



Now take the wooden miter bar to your tablesaw and fit it to the slot. If the fit is a little loose, tighten the setscrews until they bottom out. As you continue to tighten, they'll force the tabs out slightly, effectively making the bar wider.

When the bar slides freely in the slot with no side-to-side play, the fit is perfect. Attach the bar to your jig, and you're ready to roll.

—Robert Tutsky, Guilford, Conn.

Continued on page 26

We've Nailed It!

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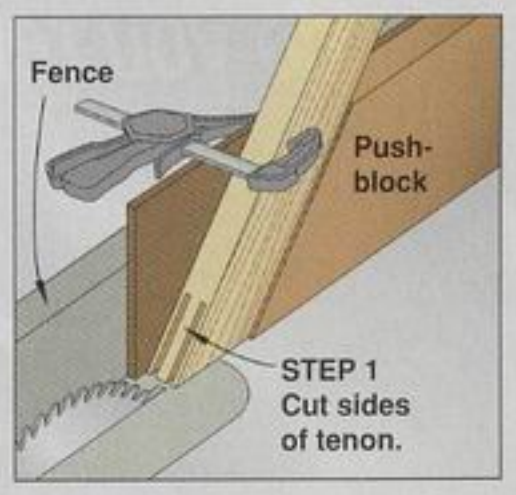
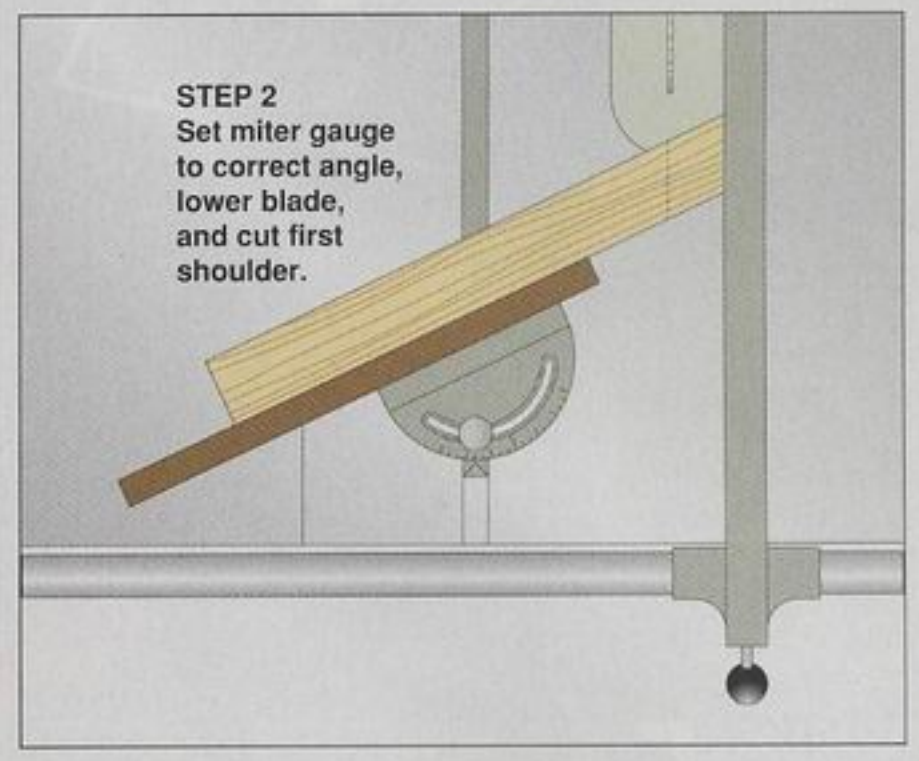
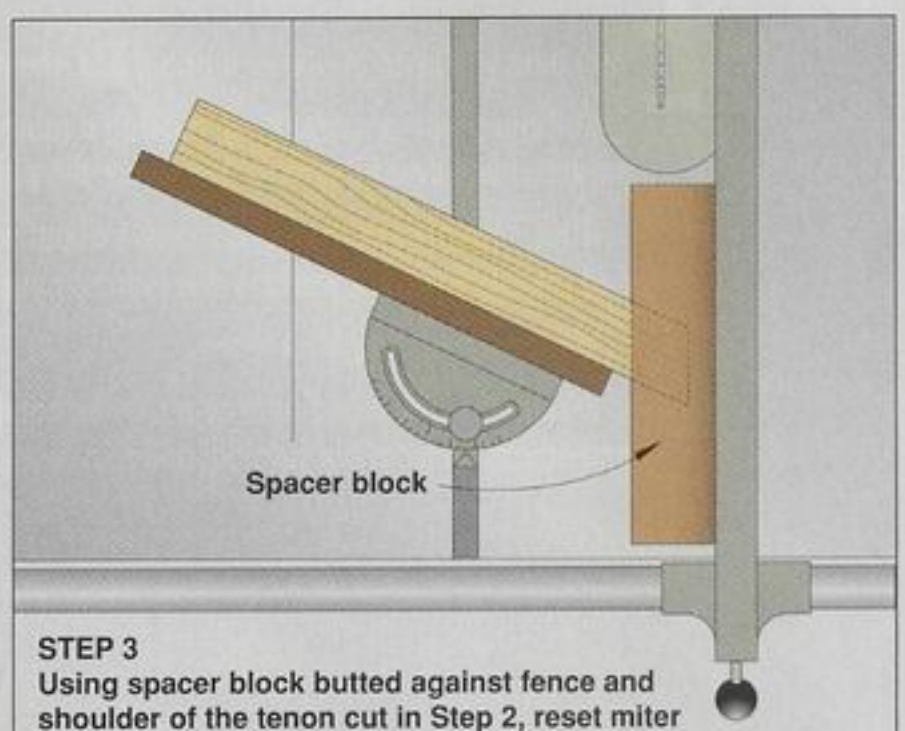
Cut angled tenons with shoulders you won't cry on

Cutting straight tenons is pretty straightforward, but mitered tenons challenge even the most skilled woodworker. The first angled shoulder cut is simple; precisely matching that angle on the other tenon shoulder, though, can bring a grown man to tears. Follow the three-step process shown here and they'll match every time.

— Chuck Hedlund, WOOD® magazine master craftsman





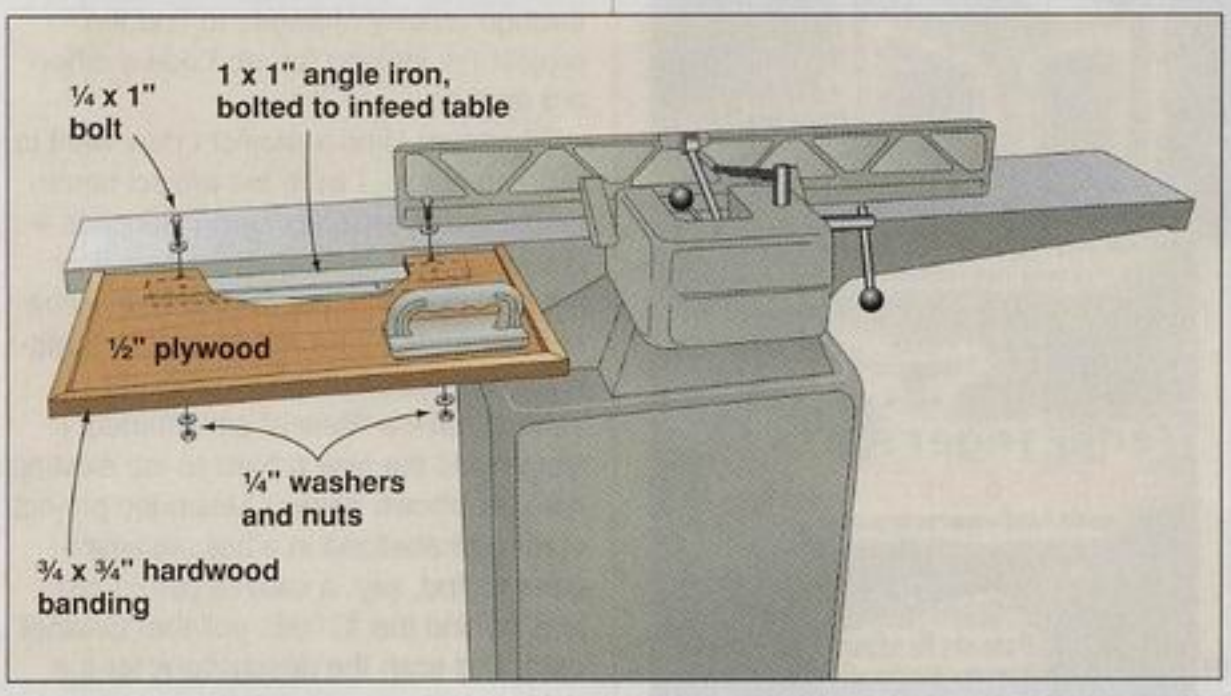


STEP 3
Using spacer block butted against fence and shoulder of the tenon cut in Step 2, reset miter gauge to opposite angle. Remove spacer, butt end of workpiece against fence, and cut second shoulder.

A home for mislaid pushpads

I move my jointer around the shop thanks to its mobile base, but it seemed like wherever the jointer was, my pushpads *weren't*. So, I bolted a length of angle iron to the infeed table, and a shelf to the angle iron, as shown at *right*, to keep the accessories handy. The banding stands ¼" proud to keep shelved items from vibrating their way to the floor.

—Randy Courts, Sonora, Calif.

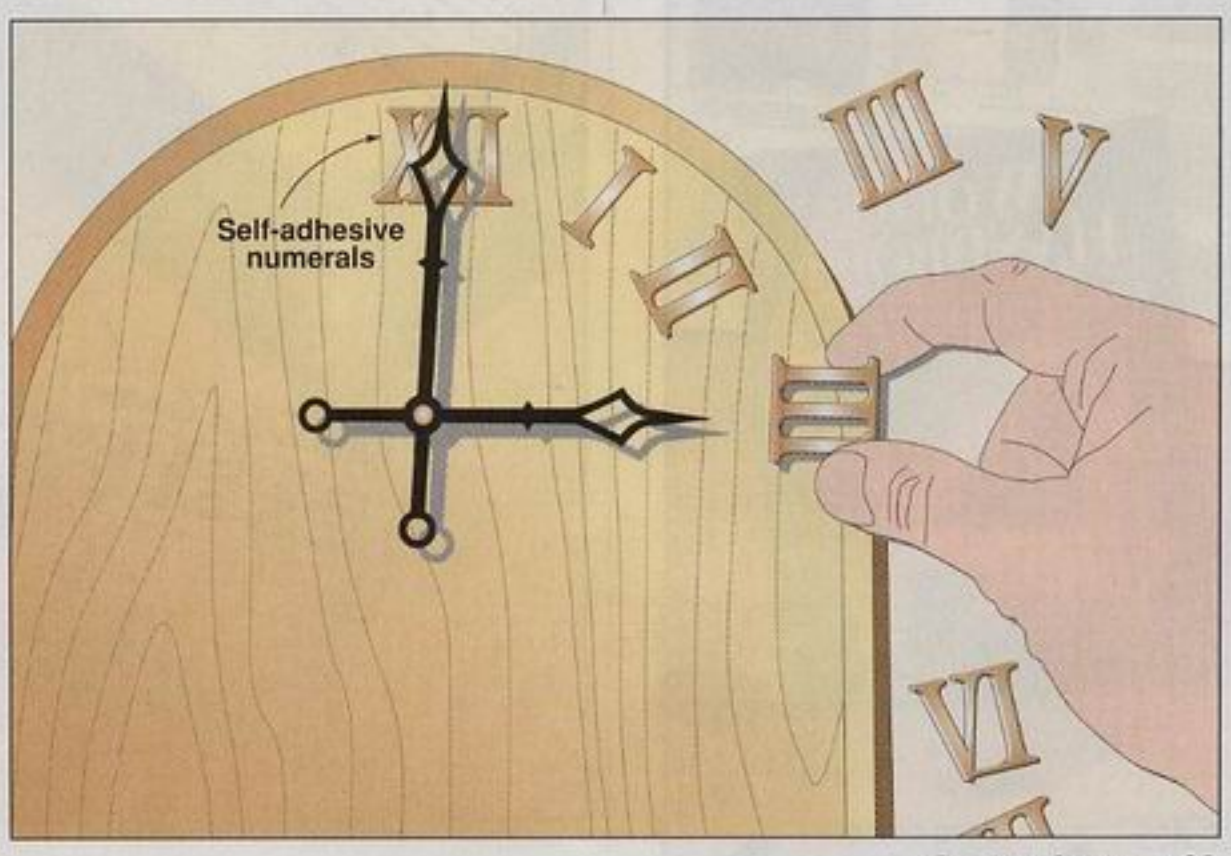


Timesaving tip for clockmakers

If you've ever built a clock where you had to apply numerals to the face, you know that locating the 12, 3, 6, and 9 spots is pretty simple. But it's harder to get the spacing just right for the rest of the numerals. Here's what I do.

Before adding the numerals, I install the clock works, including the hands, and then set both hands to the 12 o'clock position. Then, I turn the minute hand one full revolution and add the "1" numeral at the end of the hour hand. I then work my way around the clock, one hour at a time.

—Mahlon Davenport, Port Allegany, Pa.



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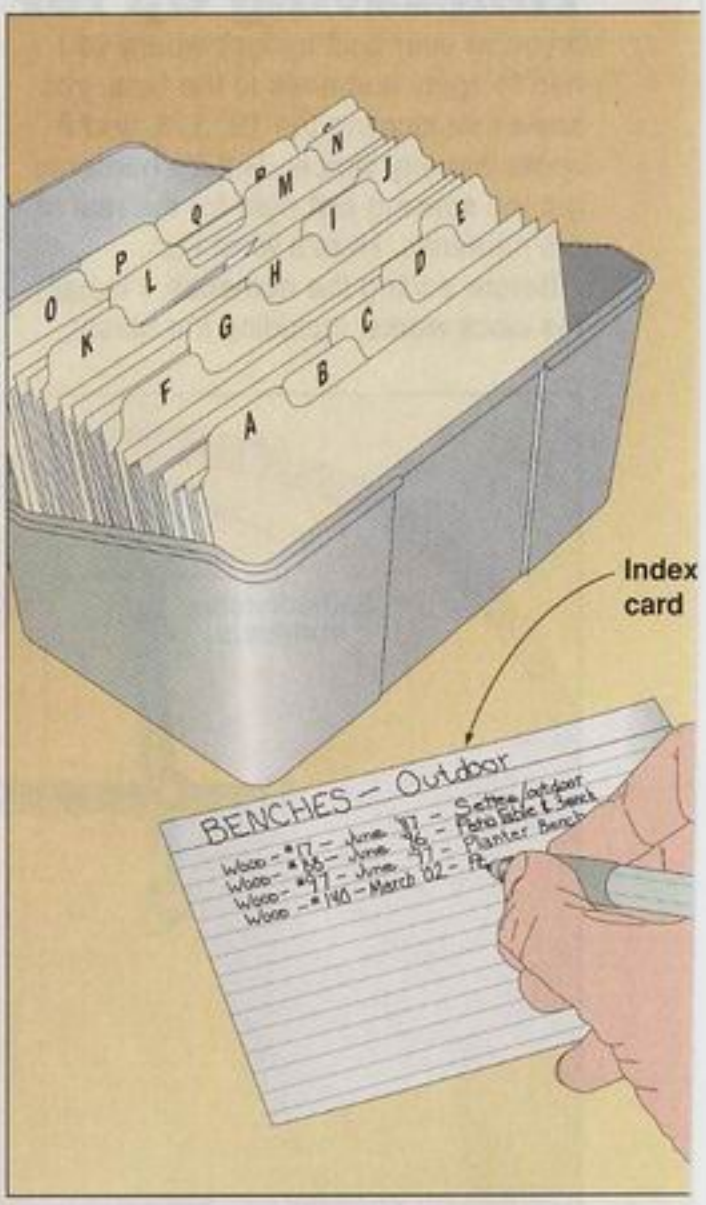
shop tips

Magazine index is in the cards

Jack Simpkins' Shop Tip in issue 143 about photocopying magazine tables of contents for a master index is a terrific one. But I subscribe to a number of magazines and would still have to rifle through a flurry of pages to find the project I'm looking for, so I use a different method.

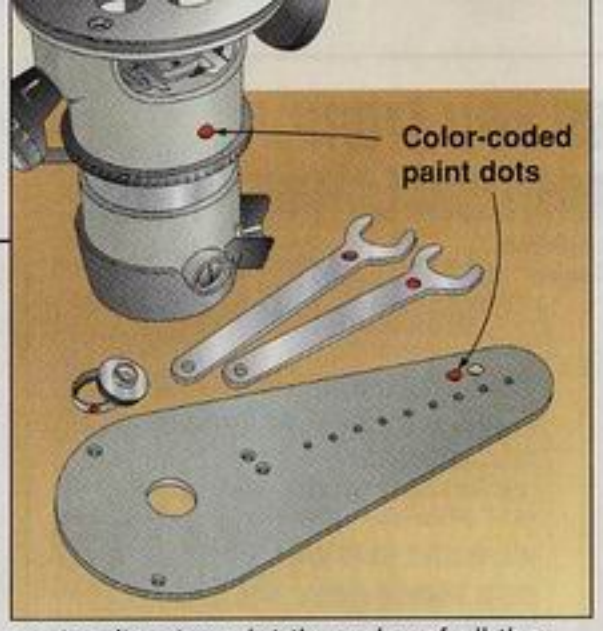
Whenever I find a project I may want to build someday, I write the project name on the top of an index card ("Benches—outdoor," for example). Then on a line below, I write the magazine name, issue number and/or date, and a two- or three-word description of the project. (If I already have a "Bench" card started, I simply add the new project to the existing card, as shown *below*.) I keep the project cards alphabetized in a box, so when I need to find, say, a cabinet plan, I just look behind the "C" tab, pull the "Cabinet" card, and scan the descriptions for the right project.

—Craig Petith, Ossining, N.Y.



Color-code tools, jigs that match

Like many people, I've accumulated several routers, all with various wrenches and accessories that fit only a particular machine. To eliminate the confusion over which accessory goes with which tool, I color-code them by painting a small dot of the same color on a router and all of its accessories. If a jig or accessory works with more than one router, it gets a dot the color of all the tools it'll work with.



—Bill Thorne, Lone Jack, Mo., via WOOD ONLINE®

A press for gluing stacked bowl blanks

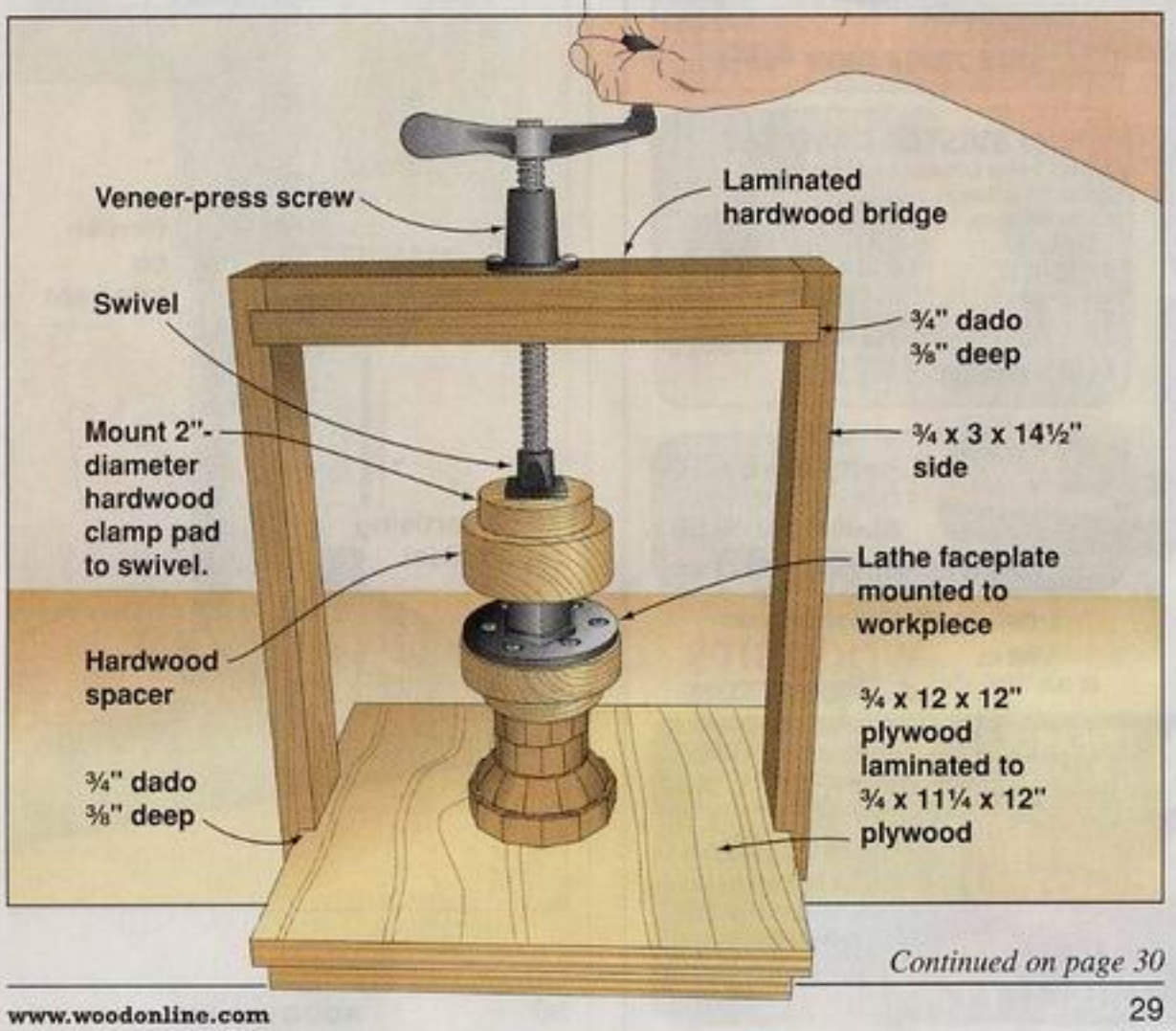
Until recently, I used my drill press to clamp layers of wood together for vases or bowl blanks. Problem is, the drill press isn't really designed for this task, and I actually bent the rack gear on a large drill press doing it. After that, I decided there had to be a better—and less expensive—way.

So, I came up with the clamping fixture shown in the drawing *below*. The heart of the system is a simple veneer-press screw costing less than $20 (part no. 143569 at Woodcraft, 800/225-1153 or www.woodcraft.com). I made the sides and bridge from ¾×3" hardwood scraps, and the base from some left-over plywood.

After assembling the base, sides, and bridge, I removed the swivel from the end of the veneer-press screw, drilled a hole slightly larger than the screw in the center of the bridge, then mounted the screw as shown. Finally, I mounted a shop-made hardwood clamp pad to the swivel.

This clamping fixture works great and provides even pressure, reducing the likelihood of collapsing the segments below the new glue joint. The screw isn't long enough to reach the bottom layers of a glue-up by itself, so I keep a handful of hardwood spacers on hand that I can stack between the clamping pad and lathe faceplate.

—Bob Weigel, Tucson, Ariz.


Veneer-press screw
Laminated hardwood bridge
Swivel
¾" dado ⅜" deep
Mount 2"-diameter hardwood clamp pad to swivel.
¾ x 3 x 14½" side
Lathe faceplate mounted to workpiece
Hardwood spacer
¾ x 12 x 12" plywood laminated to ¾ x 11¼ x 12" plywood
¾" dado ⅜" deep

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• 14° 3/8"
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1/2" Shank Router Bits
• 2-pc Rail & Stile (Roman Ogee) • Drawer Lock
• 3 1/4" D Panel Raiser (Ogee) • Door Lip • Glue Joint
WL-2020-1 $175 VALUE
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3/4" Bore Shaper Cutter
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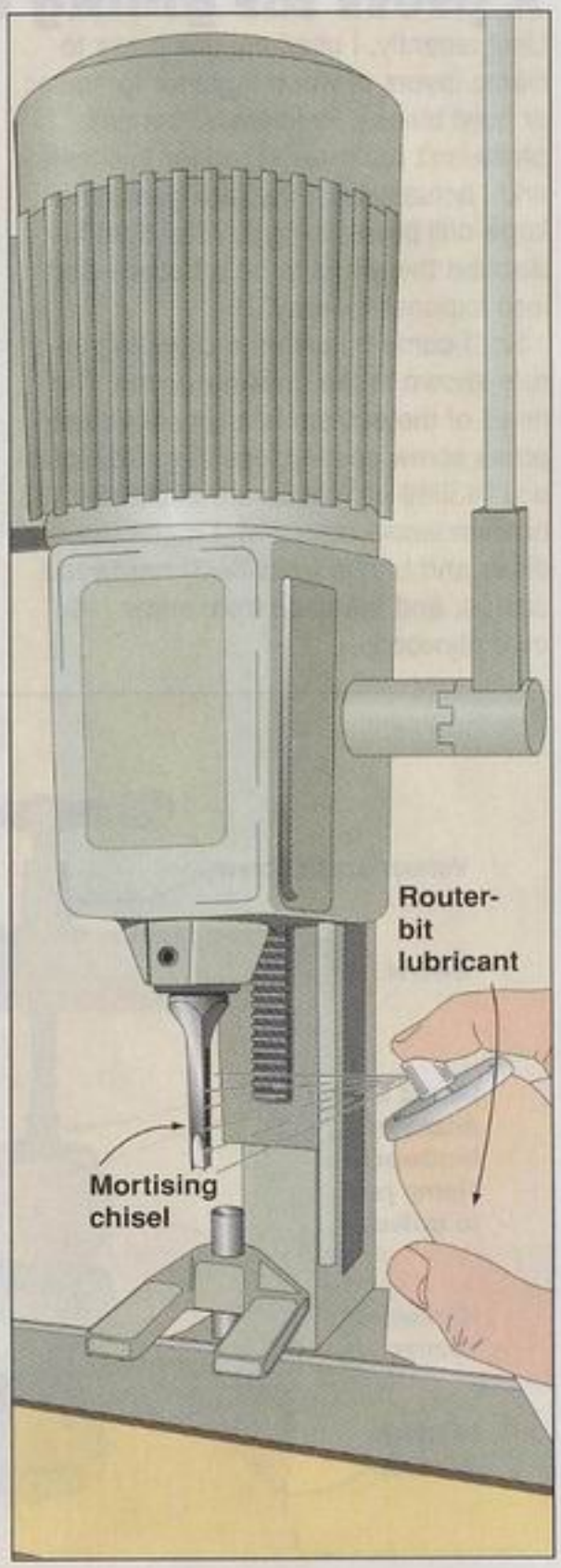
shop tips

A spritz to quiet mortising bits

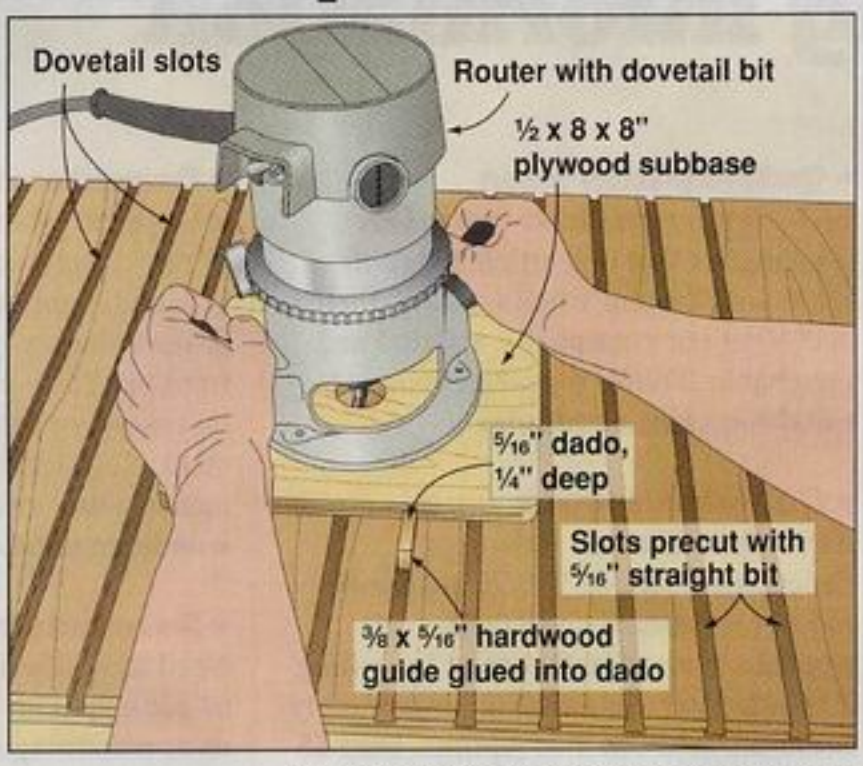
I've found that a couple of quick shots of router-bit lubricant in the hollow chisel of my benchtop mortising machine eliminates the annoying squeal I used to get with those bits. It only takes a little spritz, and I wipe off the excess before use to prevent it from contaminating my workpiece. As a bonus, I've found the bit stays cool longer and cuts quicker and cleaner.

—Tony Strother, Durham, N.C., via WOOD Online®



Rout parallel slots to perfection

I volunteered to make a tally board for my bridge club, and my plan to use sliding dovetails for each player's name block seemed so simple. To lessen the strain on my router and prevent the dovetail slot from packing with dust, I decided to precut the slots with a straight bit, then rerout them with a dovetail bit. But how could I ensure dead-on repeatable spacing for 20 slots?


Dovetail slots
Router with dovetail bit
½ x 8 x 8" plywood subbase
5/16" dado, ¼" deep
Slots precut with 5/16" straight bit
⅜ x 5/16" hardwood guide glued into dado

To solve the dilemma, I fashioned a subbase for my router from ½" birch plywood, with a ⅜×5/16" hardwood guide dadoed in place on the bottom, as shown in the drawing at right. The distance between the guide and a 5/16" straight bit mounted in the router equals the intended spacing between the slots.

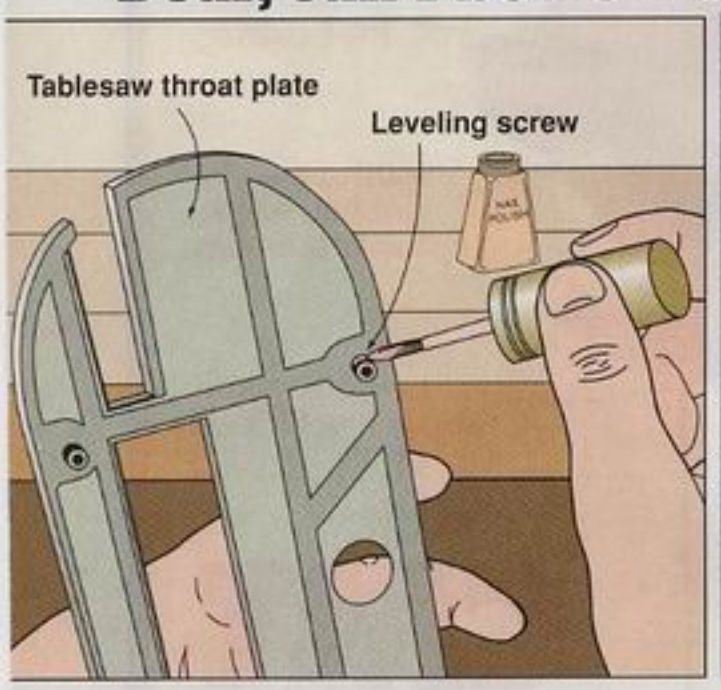
I routed the first slot with a 5/16" straight bit in my table-mounted router, then used the same bit in my handheld router, with the subbase's guide in the first slot, to rout the second slot. The second slot guided the router for the third slot, and so on, until I had cut the number needed.

Next, I switched to my dovetail bit, and set the cutting depth so as to not widen the original 5/16" slot. I used the second slot to dovetail the first slot, then rerouted the remaining slots into dovetails, using the adjacent slot as a guide.

The jig worked like a champ, saved me a lot of time over alternative methods, and the results were flawless. Before you try this, you'll need to make some test cuts to figure out the precise relationship between cutting depth, dovetail-bit angle, and straight-bit diameter to make sure the slots will work for your project.

—Charles Hoffman, Ellicott City, Md.

Dear, can I borrow some nail polish?



What do you do when you need to set a screw, such as the leveling screw on your tablesaw throat plate or router-table insert, and you don't have any Loc-Tite on hand? Hike up your pants, adopt your most macho posture, strut up to your wife, and ask to borrow some fingernail polish. A dab on the threads keeps the screw from vibrating loose.

—Joe Valorose, Midlothian, Va., via WOOD ONLINE

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This quick-to-make project slides between the rails in the lathe bed (known as the ways) and cradles turning tools within arm's reach. When not in use, it hangs on the wall out of the way. Feel free to customize it for the number and types of turning tools you own.

To size your tool rest, start by measuring the overall length of your turning tools to determine the length of the backboard (A). We made ours 21", just a bit shorter than most of the tools. Now measure from the butt end of the handles to the ferrules (the ring on the handle near the blade). This determines the distance between the upper rest (B) and base (D), as shown.

Next, measure the diameter of each tool's ferrule and of each handle 2" from the butt end. Cut two 2×10¾" plywood strips to make the upper rest (B) and lower rest (C) and mark lines 1¼" from one edge. Lay out hole centerpoints along those lines, where dimensioned on part B, at *right*. Drill holes to match the ferrules in one strip and to match the handles in the other. Rip the rests (B, C) to width and attach them to the backboard. Then add the base (D). Two screws in each edge of the backboard retain a 10" miniature bungee cord that secures the tools.

The cleat and retainer (E, F) are sized to fit most lathes, but check the distance between the ways on your lathe. The cleat needs about ¼" clearance to slide easily. Make the wall-mount parts (H, I) and secure this assembly to a wall stud.

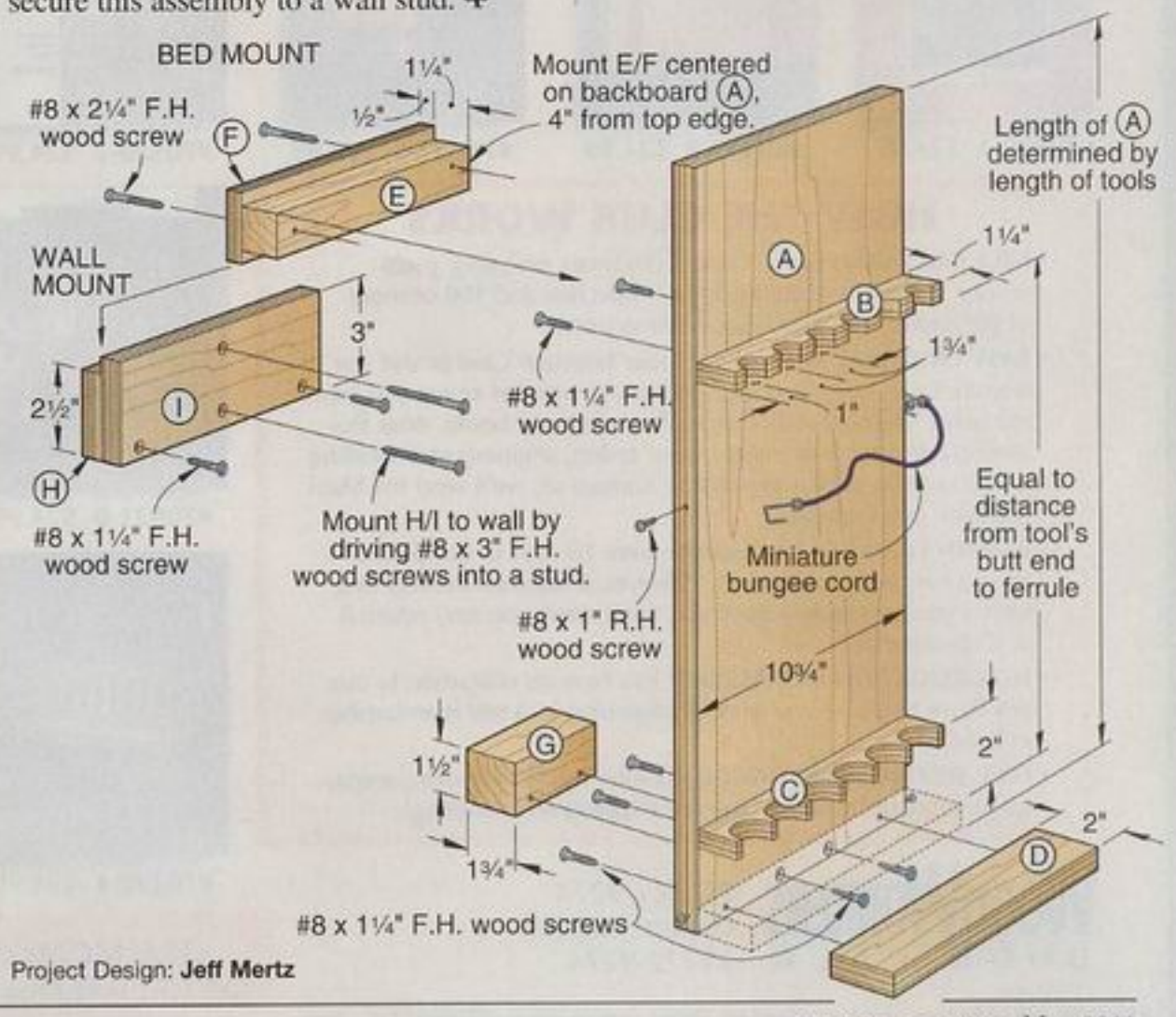
materials list

Part	FINISHED SIZE T	W	L	Matl.	Qty.
A backboard	¾"	10¾"	21"	BP	1
B* upper rest	¾"	1¼"	10¾"	BP	1
C* lower rest	¾"	1¼"	10¾"	BP	1
D base	¾"	2"	10¾"	BP	1
E cleat	1⁵⁄₁₆"	1¼"	9¼"	P	1
F retainer	½"	2"	9¼"	BP	1
G base block	1½"	1¾"	4"	P	1
H hanger strip	¾"	2½"	9¼"	BP	1
I hanger cap	¾"	3"	9¼"	BP	1

*Parts initially cut oversize. See the instructions.

Materials key: BP–birch plywood, P–pine.

Supplies: #8×1¼" flathead wood screws (10), #8×2¼" flathead wood screws (2), #8×3" flathead wood screws (2), #8×1" roundhead wood screws (4), 10" miniature bungee cord.



Project Design: **Jeff Mertz**

ask wood

Answers to your questions from letters, e-mails, and WOOD ONLINE®

Cracking the glue code

Q: When I buy glue, I can't find a production or expiration date on the containers. It could have been sitting in the store for years—how do I know how old it is?

—Dave Starr, Zumbrota, Minn.

On the left is the code on a bottle of Titebond glue that was manufactured in July 2002. On the right you see the worst-case result of keeping yellow glue too long.

A: Dave, the answer is right there on the glue bottle—once you know the code. Here's how to interpret the line of numbers and letters stamped on the containers of white, yellow, and polyurethane glue produced by Franklin International, maker of Titebond and the biggest supplier of woodworking glue.

In the typical code shown at *near right*, the first number represents the final digit of the year in which the glue was produced; it's followed by a letter designating the month, with "A" standing for January, "B" for February, and so forth. (They skip "I" because it looks like the number 1.) You can ignore the rest of the code, which relates to the particular batch of glue.

Elmer's glue carries a similar code. In this case, however, the series starts with a letter corresponding to the year of manufacture, with "H" standing for 2002 and "I" signifying 2003. The two numbers following tell you the day of manufacture, and the next letter reveals the month, with "A" designating January, etc.

Now, what should you do with that information? According to Franklin spokesman Dale Zimmerman, white and yellow glue have a shelf life of two years; polyurethane and liquid hide glue have a one-year shelf life. Note: Franklin's hide glue carries an uncoded expiration date to make sure everybody can read it. That's because degradation is a greater problem with this type of glue.

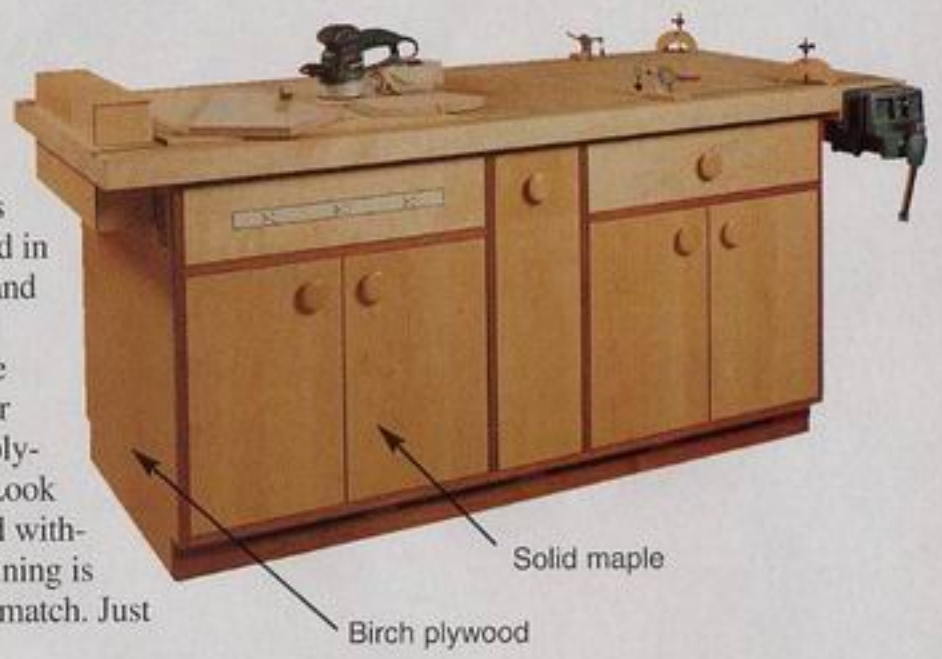
If your retailer removes the code, look elsewhere for that bottle of glue. When you take the glue home, write the date of purchase on a piece of masking tape and place it on the container as a clear reference to the glue's age. Then store it out of direct sunlight.

Save by mixing maple with birch

Q: I'm planning to build an armoire with maple. Can I substitute something less expensive for the solid wood and the plywood, and stain it to look like maple?

—Paul Stroik, Stevens Point, Wis.

A: We suggest a compromise, Paul. Here in the *WOOD*® magazine shop, we've found that solid maple and birch plywood match very nicely—better than solid birch and birch ply, actually. So when we built the side-draft workbench in issue 133, for example, we used solid maple for edge banding, drawer fronts, and doors, but switched to much less costly birch plywood for the end panels. This combination looks good in any style of furniture, and saves a lot; at our local lumber store, ¾" maple plywood costs $106 per sheet, while ¾" birch plywood costs only $68. Look for clear birch plywood without dark figure. No staining is necessary to achieve a match. Just apply a clear topcoat.



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And the best gluing surface is. . .

Q: Which surface results in the strongest glue joint: A perfectly smooth one, or one with some roughness left from sawing?

—Paul Kimura, Mililani, Hawaii

Smooth surfaces produce the best glue joints. They also make it easy to spread the glue with a touch of your finger.

A: When you use woodworker's glue, the best glue bond results when two pieces of wood make maximum contact, Paul. So always go for a flat, true surface. We've all heard the theory that a rough surface gives glue something to grab onto, but tests have shown no advantage, and that roughness can cause slight gaps in the joint.

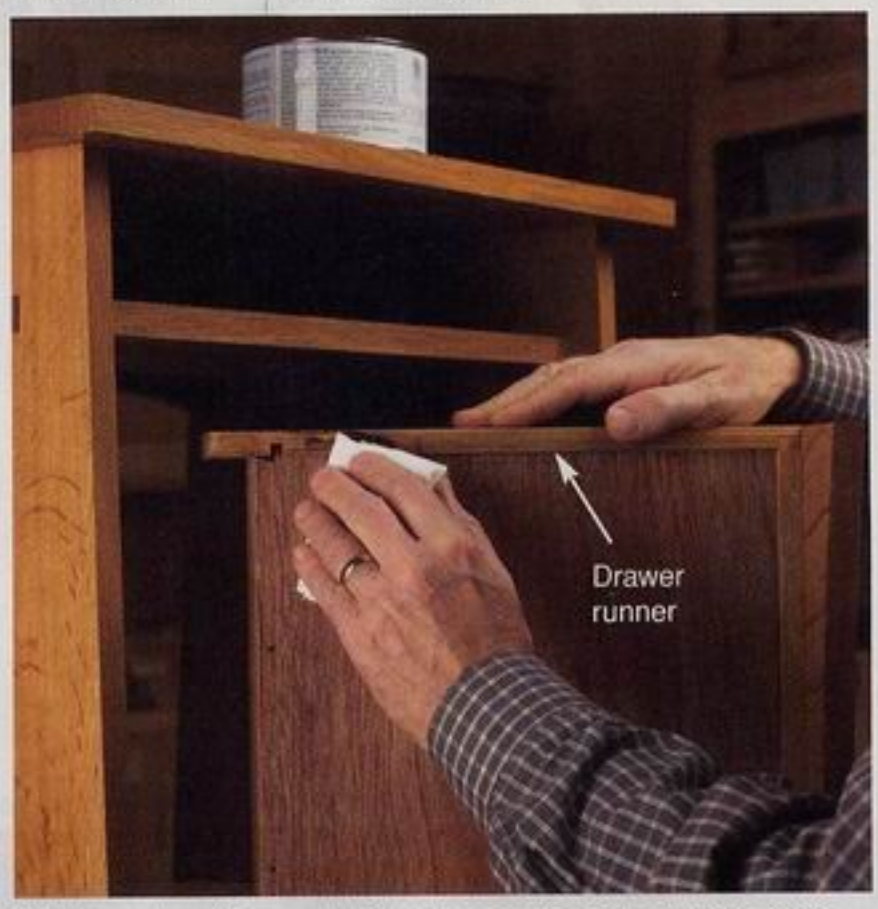
Woodworker's glue holds just fine on a smooth surface, as long as you keep these rules in mind: Make sure the wood is dry because moisture harms glue joints; use sharp knives in your jointer and planer because dull ones produce glazed surfaces that affect gluing; and remove any dirt, dust, grease, or oil from the surfaces right before you apply glue.

Keep drawers sliding smoothly

Q: I've built a couple of jewelry boxes with wood drawers on wood runners. What's the best lubricant to make the drawers slide without sticking?

—Tom Carpenter, Clayton, N.C.

A: You can find lots of high-tech materials designed for that job, Tom, but all you really need is high-quality furniture wax. Apply your finish of choice to all parts of the drawer and the inside of the box, including the runners. Then, after the finish dries and cures, coat the runners with wax that contains a high percentage of carnauba, which is harder than beeswax. One application lasts a long time; when the drawer no longer slides smoothly, all you need to do is rub on a fresh coat of wax.



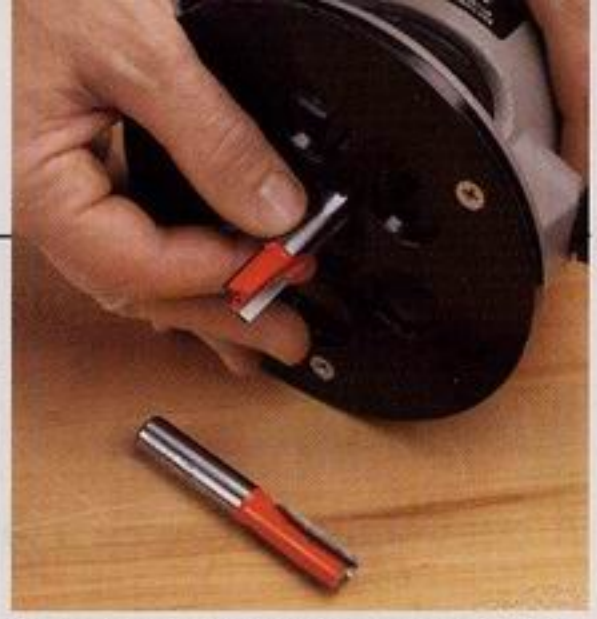
It takes only a thin coat of paste wax to keep drawers working well. Rub on a good quality, hard wax, and then let it turn hazy before you buff the surface.

Continued on page 41

No speed limit for long router bits

Q: I know that you're supposed to run large-diameter router bits at slower speeds, but what about long bits? It seems as if they will flex as you apply sideways pressure while using your router; do high speeds affect the quality of the cut?

—Scott Graham, Morgantown, Pa.



Once you choose the best router bit for the job, mount it about ⅛" from the bottom of the collet. Tighten the collet just enough to prevent slippage.

A: Scott, the short answer is no. Flexing of the bit can affect the quality of a cut, but it isn't related to bit speed. Instead, you need to consider the size of the shank, the depth of cut, and the length of the bit.

Jim Brewer, vice president of operations at Freud, makes these recommendations for the best results. First, use a bit with a ½" shank whenever possible, rather than a lighter ¼" shank. You'll reduce the vibration that leads to chatter marks. Second, use the shortest bit that's adequate for the task. Cutting with just the tip of a long bit magnifies the effects of bit flex and machine runout.

Don't ditch a dished stone

Q: I have an old sharpening stone that I got from my dad, and the middle is "dished out" from years of use. Is there a way to flatten it so it's usable?

—Rob Allen, via WOOD ONLINE®

Thick glass gives you a flat, solid base for truing up a dished sharpening stone, and silicon carbide sandpaper does the rest.

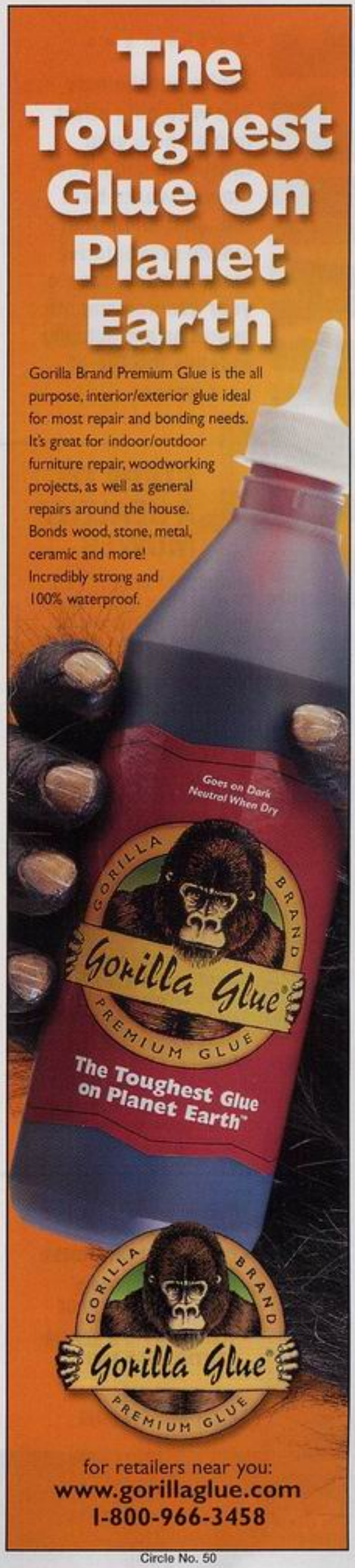
A: Rob, this sounds like a good reason to make a lapping plate, which you also can use for other flattening and sharpening purposes. Here's how to do it with common materials: Affix a piece of ¼" glass to your benchtop with double-stick tape or by clamping a wood stop at each end, and then glue a piece of 100-grit silicon carbide sandpaper to the glass with a spray adhesive, such as 3M's "77." Rub the stone on the sandpaper, cleaning the paper frequently, until the stone is flat. When the sandpaper becomes worn, remove it with a razor-blade scraper.

For faster results, buy 100-grit silicon carbide powder from a lapidary supply outlet. Mix a teaspoon of grit and a teaspoon of water on the glass, and grind the stone into the resulting slurry.

You also can flatten a stone by rubbing it on a flat stone of similar grit; this works especially well with water stones. Or, rub any kind of stone on a coarse diamond stone. However, it seems a shame to wear down an expensive diamond stone any faster than necessary, so we suggest doing most of the flattening with one of the other methods.

Got a question?

If you're looking for an answer to a woodworking question, write to **Ask WOOD, 1716 Locust St., GA-310, Des Moines, IA 50309-3023** or send us an e-mail at **askwood@mdp.com**. For immediate feedback from your fellow woodworkers, post your question on one of our woodworking forums at **www.woodonline.com**.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padauk

A beautiful exotic with a tendency to fade

Freshly sawn African padauk (*Pterocarpus soyauxii*) is famous for its vivid red-orange color, visible in the center portion of the flower vase in the photo, *below*. The wood is sometimes streaked with brown, and features coarse, interlocking grain somewhat reminiscent of mahogany.

Unfortunately, padauk has a dark side, literally. With exposure to ultraviolet (UV) light, the wood loses its orange hue, becoming brown and nondescript, as the vase also shows. The good news: You can reduce the discoloration by using a finish with UV protection, and by keeping projects built from padauk away from direct sunlight.

In the shop, padauk machines well with little tear-out or burn. The dense wood holds a crisp edge, making it well-suited for turning. To prevent respiratory irritation, wear a dust mask. The wood glues easily with yellow or polyurethane glues.

Padauk sands to a high luster. You can reduce the prominence of the open pores by using wood filler, though color matching can be a problem as the wood's tone changes over time.

Padauk at a glance

- **Color:** Red-orange, changing to brown over time
- **Availability:** Supply is good in 4/4 and 8/4 boards, and in 1- to 2-board-foot "shorts."
- **Price:** $7–$9 per board foot (4/4 "Selects" stock)
- **Density:** Moderate
- **Workability:** Good
- **Growth range:** Western Africa
- **Uses:** Furniture, accents, veneer, carving, turning, and flooring
- **Special considerations:** Sawdust causes respiratory irritation. Wear a dust mask.

The portion of this padauk vase normally covered by the flower holder remains orange, while the rest has faded to brown.

onlay accents made easy

Create that "special touch" in 6 quick steps.

Care to learn a straightforward way to lend eye-grabbing appeal to your next project? Decorative onlays, like the wheat motif on the bookshelf on *page 78*, are just the ticket. Here, you'll learn how to apply that motif, but the basic process is the same for any design. You'll find clip art provides a good source for inspiration and other motifs. And, to make your onlays pop, choose contrasting woods such as cherry and maple.

1 Plane or resaw a ¾×3×12" piece of cherry to ⅛" thick.

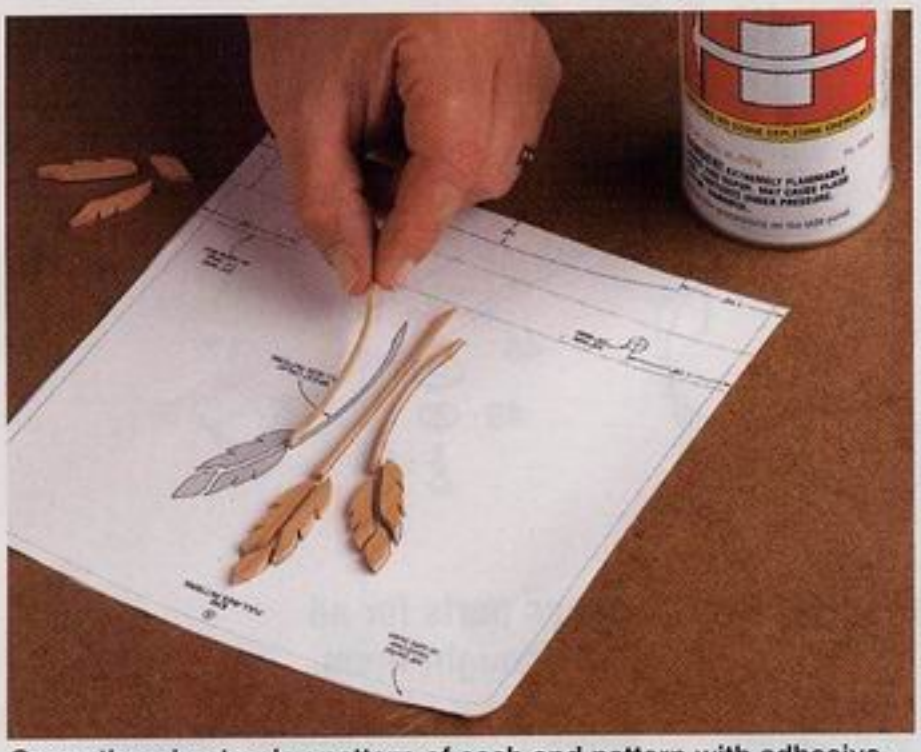
2 Make four copies of the bookshelf's end pattern on the *WOOD PATTERNS®* insert. Cut out the wheat onlay pattern from two of the copies. Attach the patterns to the ⅛"-thick cherry with spray adhesive. Trim the two remaining paper patterns to the end-piece outline. Place them printed side up on your workbench for now.

3 Using a no. 5 blade in your scrollsaw, cut the onlay pieces to shape. Remove the paper from them, and clean off any residual adhesive. (A cloth moistened with a solvent works well.) Sand the edges of the pieces to 220 grit.

4 Adhere the onlay pieces to the end patterns, as shown in **Photo A**. Lightly sand the pieces' exposed faces, and remove the dust.

5 From scrap ¾" plywood, cut two 8"-square pieces for platens. Using a toothpick, apply a thin, even coat of yellow woodworker's glue to the onlay faces. Avoid putting on too much glue as squeeze-out will be nearly impossible to remove. Apply the onlays to the bookshelf's ends, as shown in **Photo B**. Secure the onlays by clamping the platens on top of them for even pressure.

6 To further enhance the look of the onlays, add details with a small file or carving tool. Contour them by sanding with 220-grit sandpaper. For the wheat onlays, use the corner of a small square file to extend the scroll-sawn "V" notches in the wheat onto the surface of the heads, as shown in **Photo C**. Also, lightly chamfer the edges of the onlays with the file. Finally, slightly round the onlay pieces toward their edges by sanding.



Spray the wheat onlay pattern of each end pattern with adhesive. Align and press the onlay pieces to the pattern.

Align the end pattern with the bookshelf end, and press the glue-coated onlays in place.

COVER PROJECT

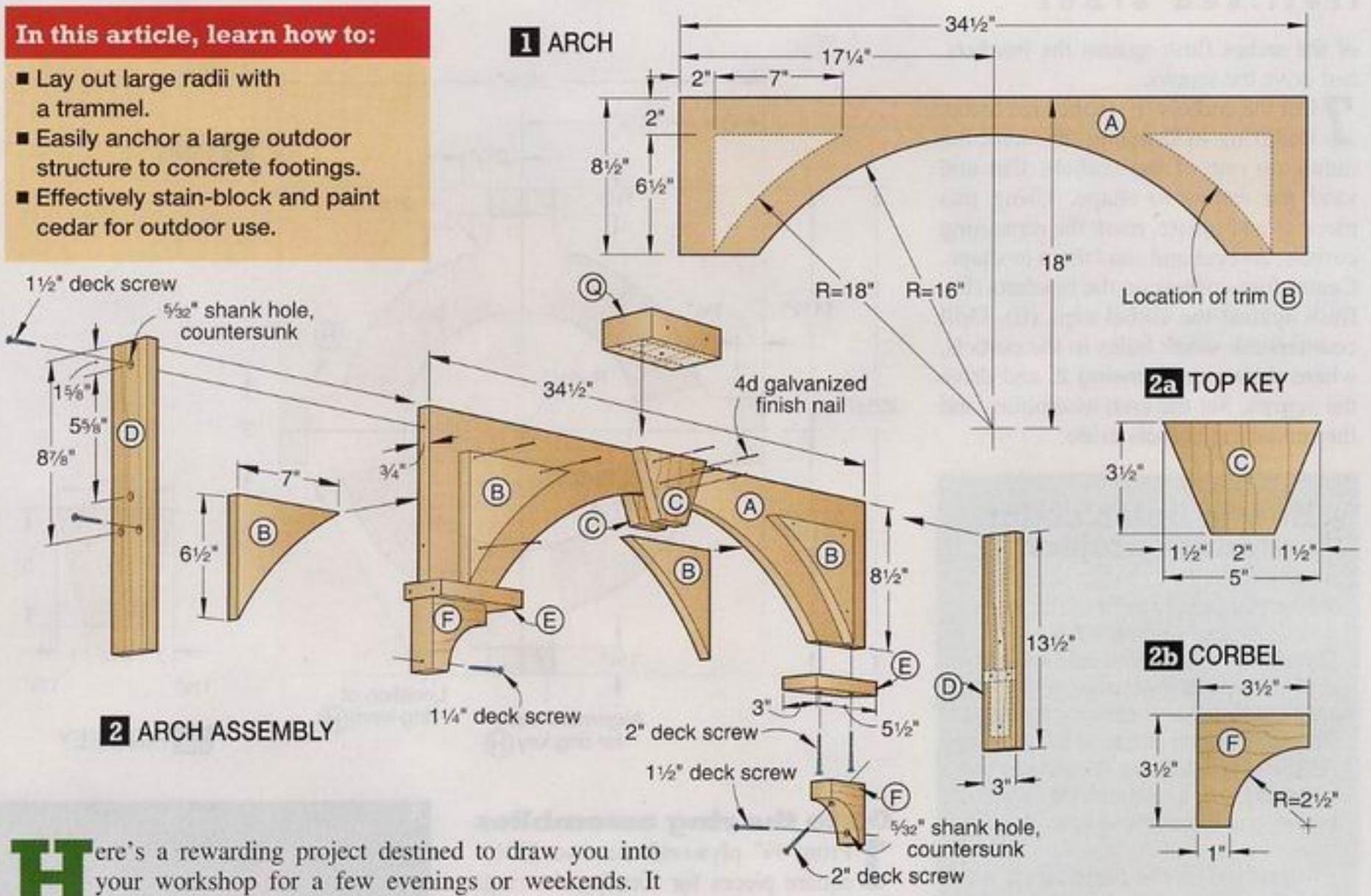
elegant trellised arbor

Basic skills and our step-by-step instructions are all you need to build this inviting garden gateway.

For the lumber and other items needed to build this project, see *page 53*.

In this article, learn how to:

- Lay out large radii with a trammel.
- Easily anchor a large outdoor structure to concrete footings.
- Effectively stain-block and paint cedar for outdoor use.



Here's a rewarding project destined to draw you into your workshop for a few evenings or weekends. It combines two straightforward joinery methods: biscuits and interlocking notches. Better still, you don't need a workshop full of tools to build it—just a tablesaw or portable circular saw, a bandsaw or jigsaw, and a biscuit joiner.

Start with the arches

Note: Use medium-density overlay (MDO) plywood for the arches (A), arch trim (B), and rings (G). This plywood, found at specialty lumberyards and building supply centers, provides excellent weather resistance and smooth surfaces for painting. Use the type that has an amber or green face on both sides for best durability. Also, you'll find it easiest to finish the arbor's parts as you complete them. See the sidebar "How to finish cedar outdoor projects" on page 48 *for details.*

1 From ¾" plywood, cut two pieces for the arches (A) to the overall dimensions listed in the Materials List. Then, cut four 6¾×7¼" blanks for the trim (B). You'll cut two trim pieces from each blank as described in step 3.

2 Using a trammel, mark the 16" radius for the arch and the 18" radii for the trim locations on the arches, where dimensioned on **Drawing 1**. (Refer to the **Shop Tip**, *right.*) Then, draw the 90° lines to locate the trim (B) where dimensioned.

3 Adhere a trim blank to one of the trim-location outlines on an arch blank using double-faced tape. Position the blank with a 7¼"-long edge at the top, and align the blank with the outline's 90° sides. Mark the 18" radius on the blank. Rotate the blank 180°, and mark the radius again. Bandsaw or jigsaw the blank to form two trim pieces. Sand their edges smooth. Using one piece as a template, mark two trim pieces on each of the remaining blanks. Now, cut the arches and remaining trim pieces to shape, and sand smooth.

4 Referring to **Drawing 2**, glue and nail two trim pieces (B) to one face of each arch, aligning them with the marked outlines. Repeat on the opposite side of each arch.

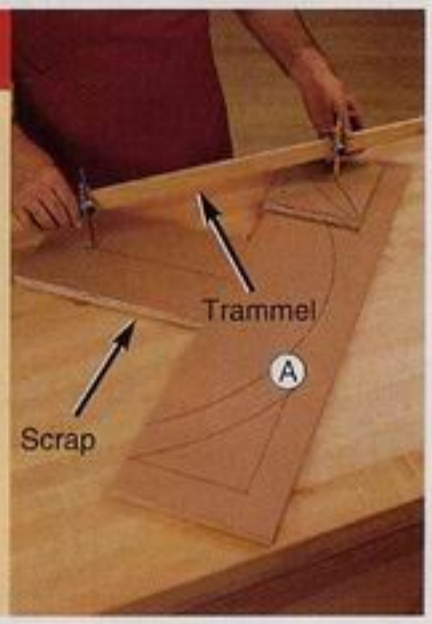
5 Cut the top keys (C) to the size listed. On one key, lay out its tapered sides, where dimensioned on **Drawing 2a**. Cut the sides, and sand smooth. Using this key as a template, mark the remaining pieces. Cut and sand them to shape. Center the keys on opposite sides of the arches with their top edges flush, and glue and nail them in place.

6 Cut the brackets (D) and corbel caps (E) to size. Drill countersunk shank holes through the back face of the brackets and bottom face of the corbel caps, where shown on **Drawing 2**. Center and clamp the brackets to the arches with their top edges flush, and drive the screws. Center the corbel caps on the bottom

SHOP TIP

How to use a trammel

Sometimes a large radius places a trammel's centerpoint off the stock, as with the arbor's arch and trim. To keep the trammel level, locate the centerpoint on a piece of scrap the same thickness as the stock being marked. Also, adjust the projection of the centerpoint pin and pencil from the trammel heads as necessary, to keep the trammel beam level.



of the arches flush against the brackets, and drive the screws.

7 Cut the corbels (F) to the size listed. Referring to **Drawing 2b**, mark the radius on one of the corbels. Cut and sand the radius to shape. Using this piece as a template, mark the remaining corbels, and cut and sand them to shape. Center four corbels on the brackets (D), flush against the corbel caps (E). Drill countersunk shank holes in the corbels, where shown on **Drawing 2**, and drive the screws. Set the arch assemblies and the remaining corbels aside.

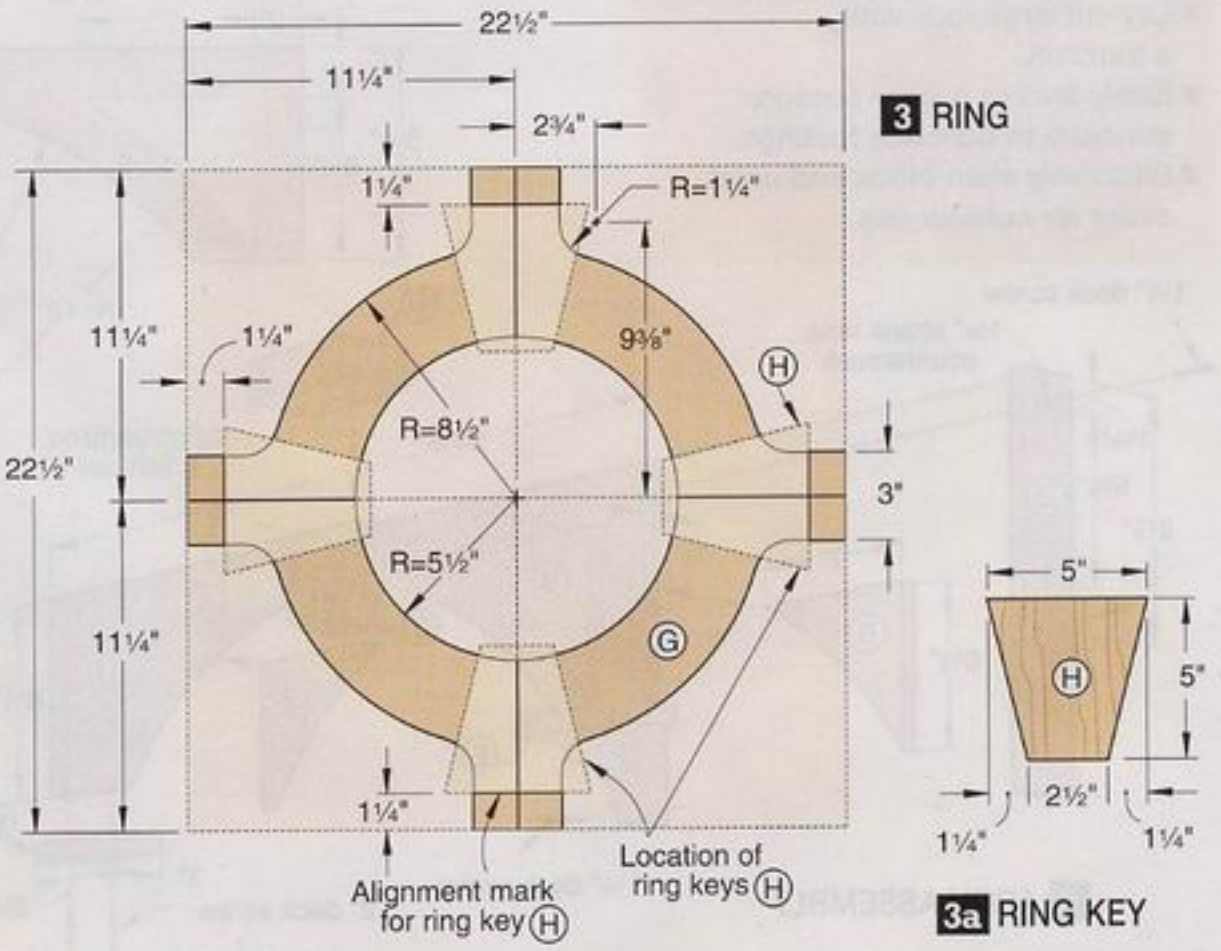
How to finish cedar outdoor projects

When you plan to paint cedar, be sure to properly prime it first. Otherwise, the colored extractives, resins, and oils that cedar contains may leach out and discolor the paint. The U.S. Forest Products Laboratory (USFPL) in Madison, Wisconsin, has done extensive research on finishing cedar, and offers these tips:

- After sanding the parts, apply a quality, exterior latex, stain-blocking primer to "lock up" the troublesome substances and prevent them from migrating into the paint. Although an oil-based primer also does a good job as a stain blocker, USFPL tests have found that it can become brittle with age and flake, whereas a latex primer remains flexible.

- Prime the knots first, as shown *below*. When dry, prime the complete parts, giving extra attention to thirsty end-grain areas. Recoat any areas where you see significant residual discoloration.

- Let the primer cure for one week, and then cover with a quality exterior latex paint.



On to the ring assemblies

1 From ¾" plywood, cut two 22½"-square pieces for forming the rings (G). Mark centerlines across the width and length of each piece on both faces. Referring to **Drawing 3**, lay out the ring shape on one face of each piece. On both faces of the pieces, draw lines 1¼" from their edges for aligning the wide end of the ring keys (H), where shown.

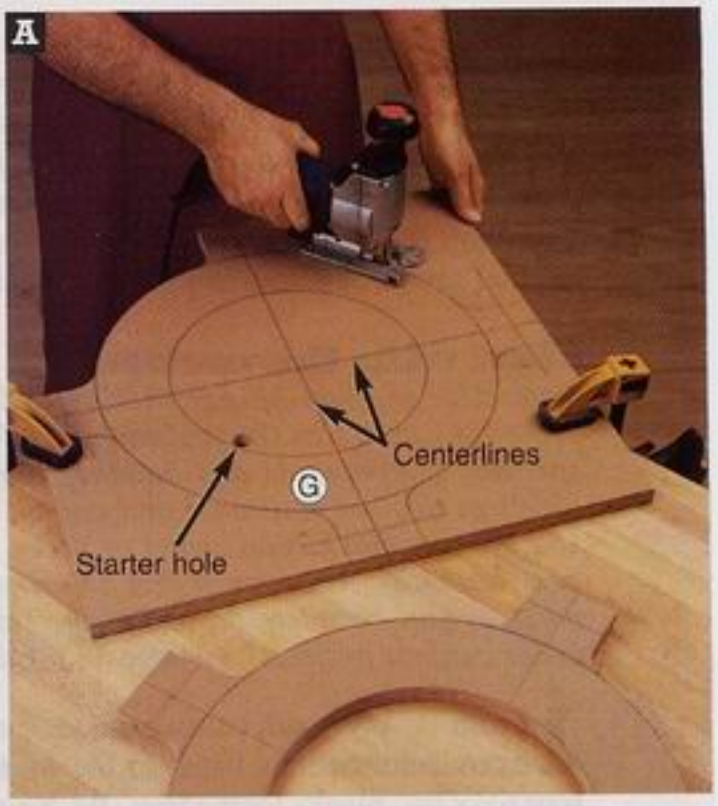
2 Jigsaw the rings (G) to shape, as shown in **Photo A**, cutting close to the lines. Finish-sand to the lines using a 1"-diameter drum sander.

3 Cut the ring keys (H) to the size listed. As you did for the top keys (C), taper the ring keys' sides, where dimensioned on **Drawing 3a**.

4 Mark a centerline across the edge of the keys at the wide end, where shown on **Drawing 4**, for aligning them with the rings' centerlines. Now, align four keys with the marks on one side of a ring, and glue and nail them in place. Repeat for the other side and for both sides of the other ring. Set the ring assemblies aside.

Next up: lattice frames

1 Cut the stiles (I) and bottom rails (J) to the sizes listed. Also, cut four ¾×7¼×15½" blanks for forming the top rails (K). Referring to **Drawing 5**, dry-assemble a lattice frame on a flat surface,

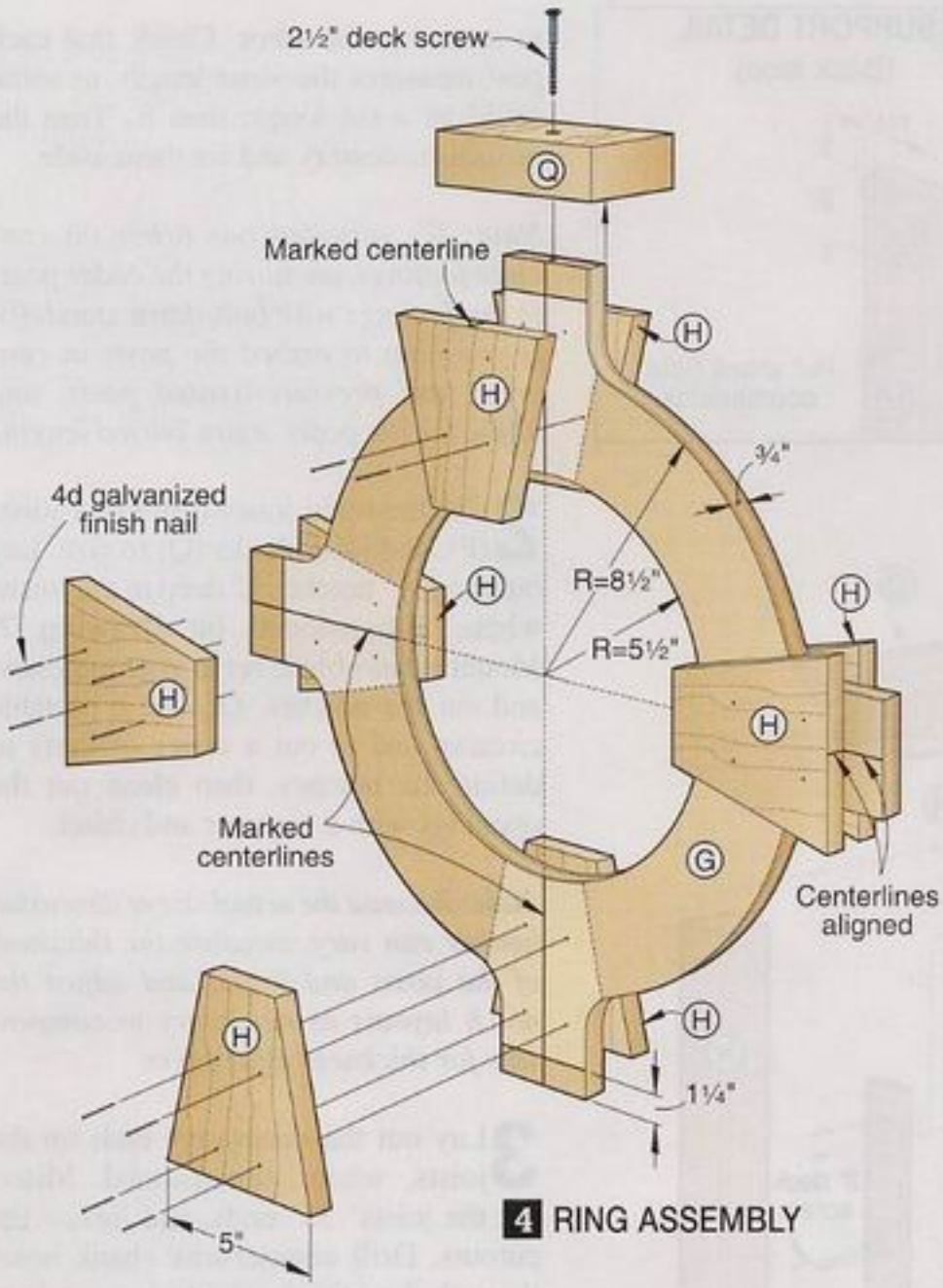


Jigsaw the outside of the ring first. Then drill a ¾" starter hole in the ring's center, and cut out the center.

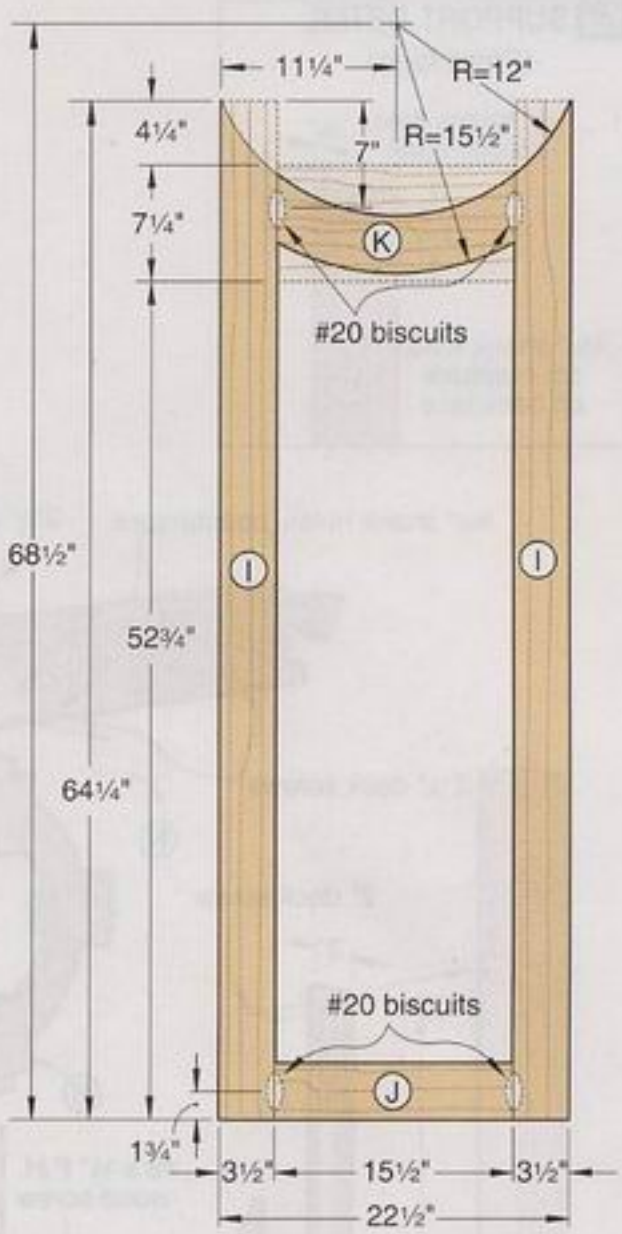
locating the top-rail blank below the top of the stiles, where dimensioned. Clamp the frame together.

2 Mark the two radii on the frame's top, where dimensioned. Then, mark the locations for the frame-joining #20 biscuits on the stiles and rails, where shown. Separate the parts.

3 Cut and sand the top rail and stiles to shape. Cut the biscuit slots in the stiles and rails. Glue and clamp the frame



4 RING ASSEMBLY



5 LATTICE FRAME

together with the biscuits, and check for square. Repeat the process to assemble the other three frames.

4 Using your tablesaw or a jigsaw, cut the PVC lattice (L) to size. The lattice flexes easily, so use a support stand or a helper to keep it flat while you cut it.

5 Place a frame on your workbench, and position a lattice panel on it, aligning the panel's and frame's bottom edges and centering the panel side-to-side. Referring to **Drawing 6**, drill a countersunk shank hole at the top center of the lattice, where shown, and screw it to the frame's top rail (K). (We used only one screw to allow for expansion and contraction of the lattice.) Position another frame on top of the lattice, aligning it with the bottom frame. Place a ring assembly (G/H) in approximate position at the top of the frame.

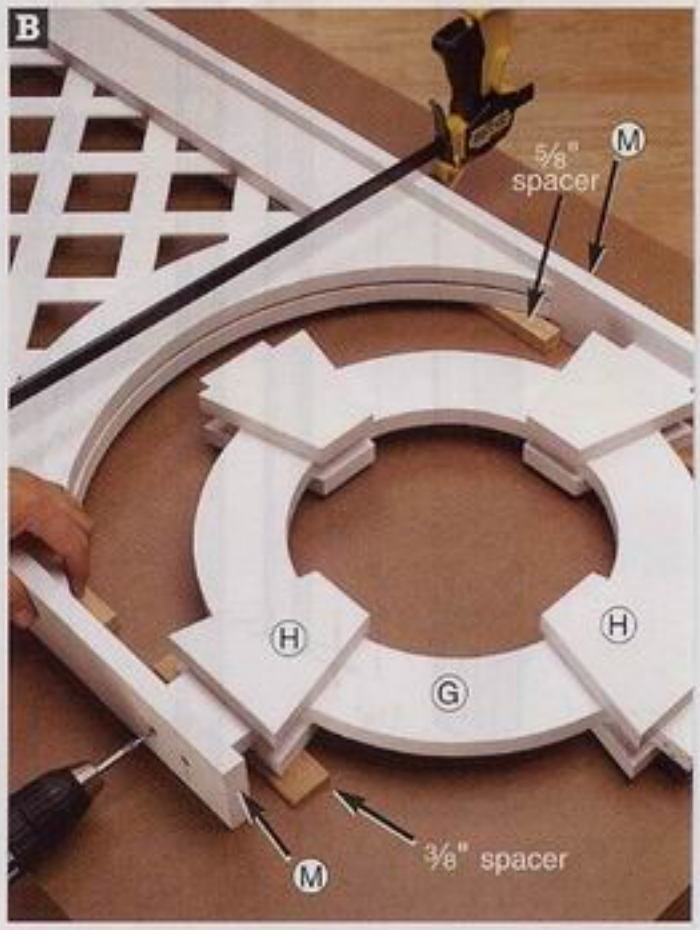
6 Cut the supports (M) to size. Draw lines across the width of the supports 1¼" from each end for aligning the lattice frame and ring assemblies, where shown on **Drawings 6** and **6a**.

7 From scrap, cut four ⅝×1×6" spacers and two ⅜×1×6" spacers. Place the ⅝" spacers under the frame assembly (one under each end of the stiles) and the ⅜" spacers under the ring assembly, where shown in **Photo B**. (This centers the assemblies on the supports.)

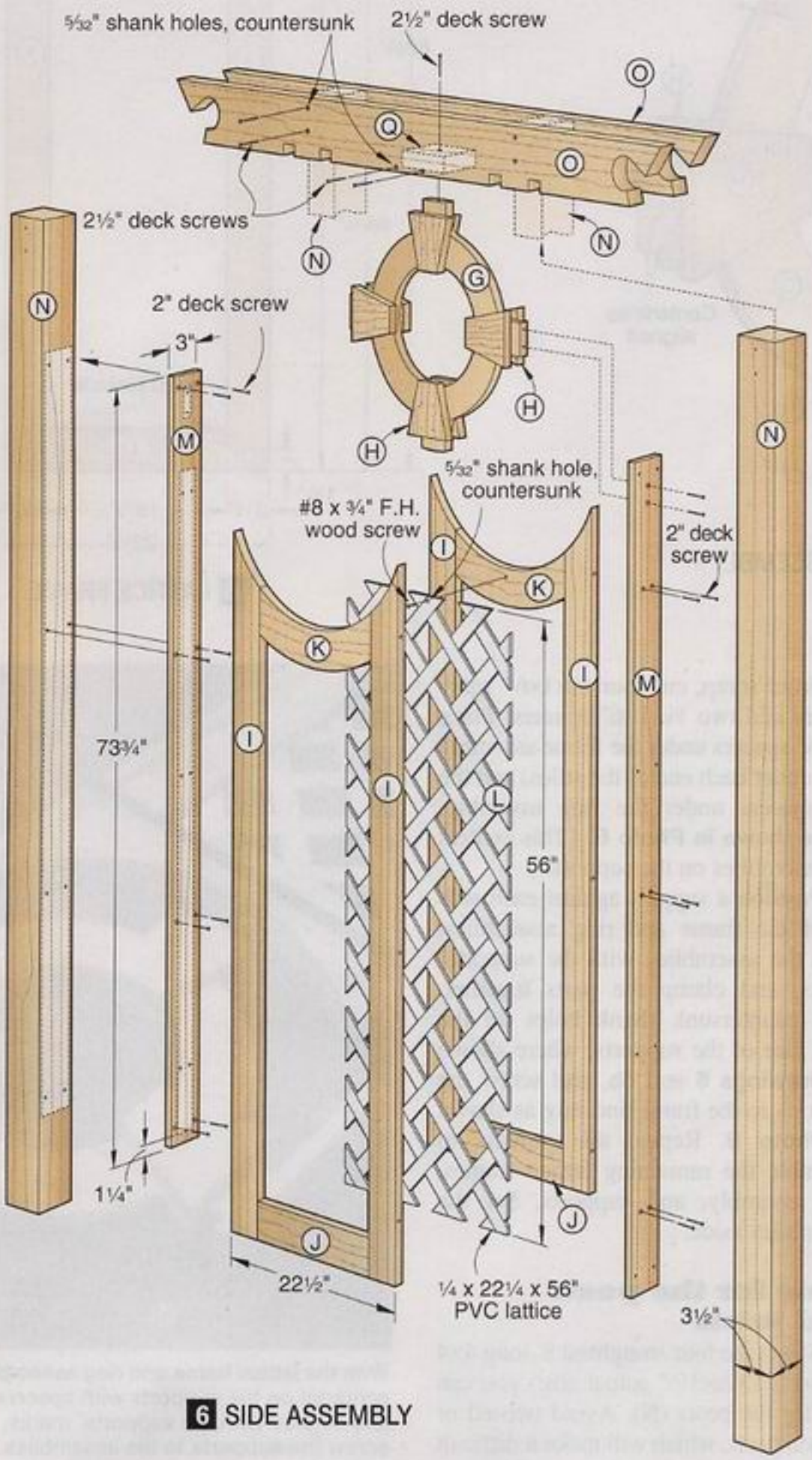
8 Position a support against each side of the frame and ring assemblies, align the assemblies with the supports' marks, and clamp the parts together. Drill countersunk shank holes on the back face of the supports, where shown on **Drawings 6** and **6b**, and screw the supports to the frame and ring as shown in **Photo B**. Repeat this process to assemble the remaining lattice frames, ring assembly, and supports. Set the assemblies aside.

Time for the posts and joists

1 Select the four straightest 8'-long 4×4 posts (3½×3½" actual size) you can find for the posts (N). Avoid twisted or warped posts, which will make it difficult



With the lattice frame and ring assemblies centered on the supports with spacers and aligned with the supports' marks, screw the supports to the assemblies.



6 SIDE ASSEMBLY

to assemble the arbor. Check that each post measures the same length, as some could be a tad longer than 8'. Trim the posts as necessary and set them aside.

Note: We installed our arbor on concrete footings, anchoring the cedar posts to the footings with bolt-down standoffs. If you plan to embed the posts in concrete, use pressure-treated posts, and allow for the posts' extra buried length.

2 Cut the main joists (O), cross joists (P), and joist blocks (Q) to size. Lay out the 1½" notches 1" deep in the joists, where dimensioned on **Drawing 7**. Mount a dado-blade set in your tablesaw, and cut the notches. Or, use a portable circular saw to cut a series of kerfs to define the notches, then clean out the openings with a hammer and chisel.

Note: Because the actual size of dimension lumber can vary, measure the thickness of the posts and joists, and adjust the notch layouts as necessary to compensate for thickness differences.

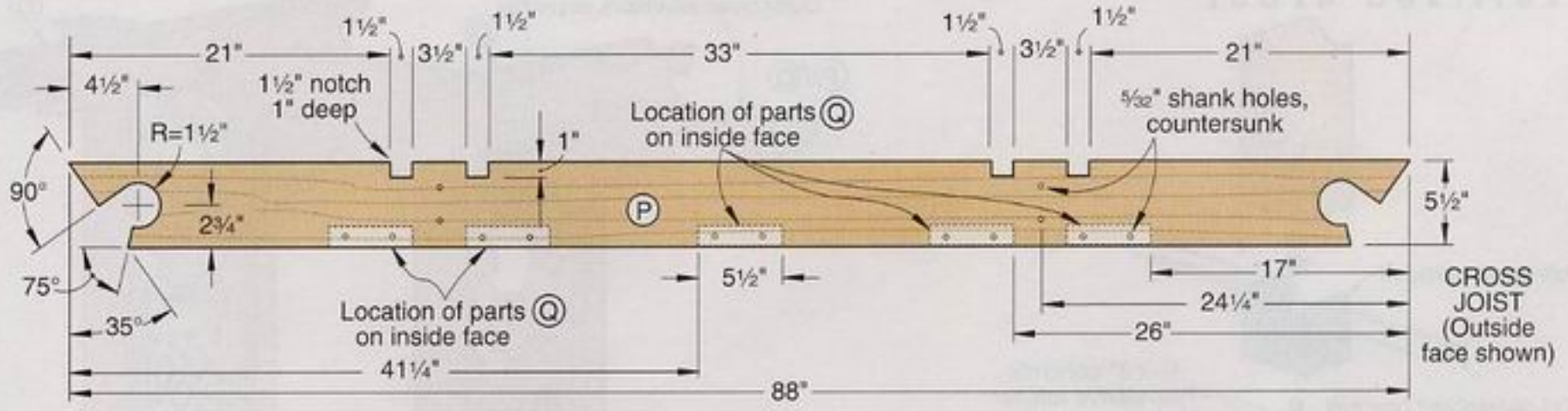
3 Lay out the decorative ends on the joists, where dimensioned. Miter-cut the joists' 35° ends, and jigsaw the cutouts. Drill countersunk shank holes through the joists' outside faces, where shown. Then, attach the joist blocks (Q) to the inside faces of two main joists (O) and two cross joists (P), where shown on **Drawing 7**, and as shown in **Photo C**. Use a scrap the width of your posts as a spacer to position the outer joist blocks on the cross joists, as shown. Set the cross joists aside.

Assemble the arbor sides

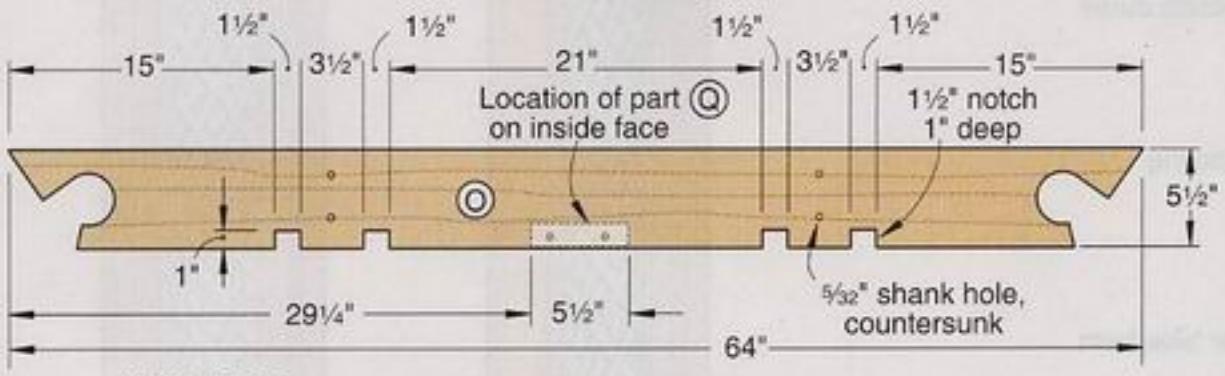
1 After painting the parts, lay a lattice frame/ring assembly on your workbench. From scrap ¼" hardboard, cut four 1×6" spacers. Place the spacers under the assembly's supports (M), one at each end.

2 As shown in **Photo D**, place a post (N) alongside each support, and position a main joist/block assembly (O/Q) across the posts with their top edges aligned and the posts centered between the pairs of joist notches. Slide the lattice frame/ring assembly up so the ring contacts the joist block (Q). Clamp the assembly together.

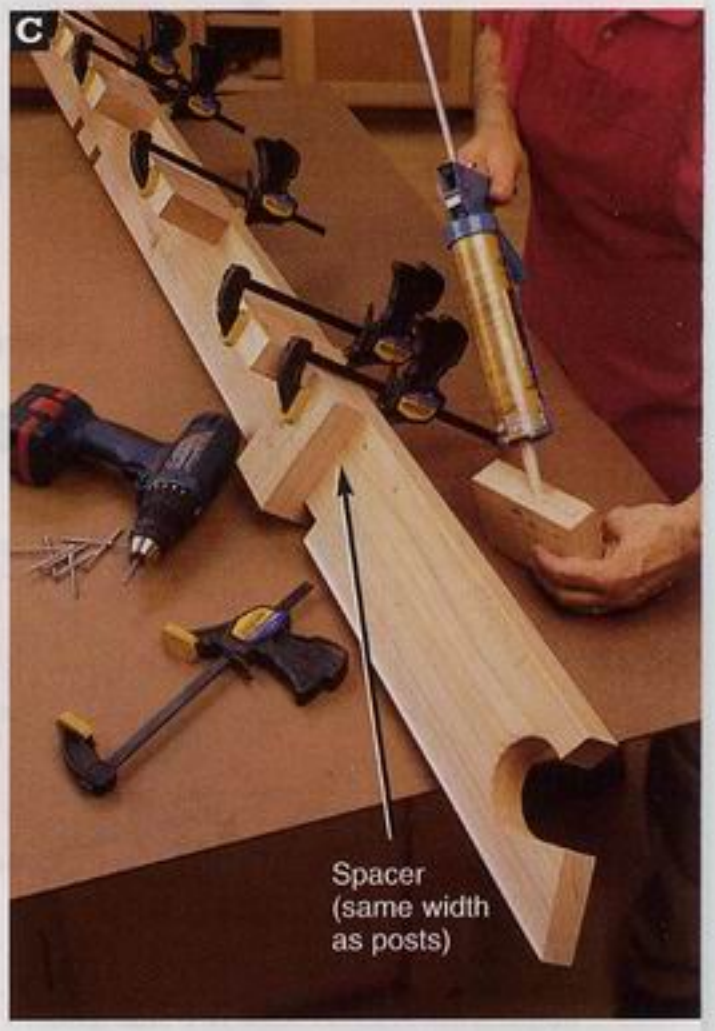
3 Drill countersunk shank holes in the supports (M) and the joist block (Q),

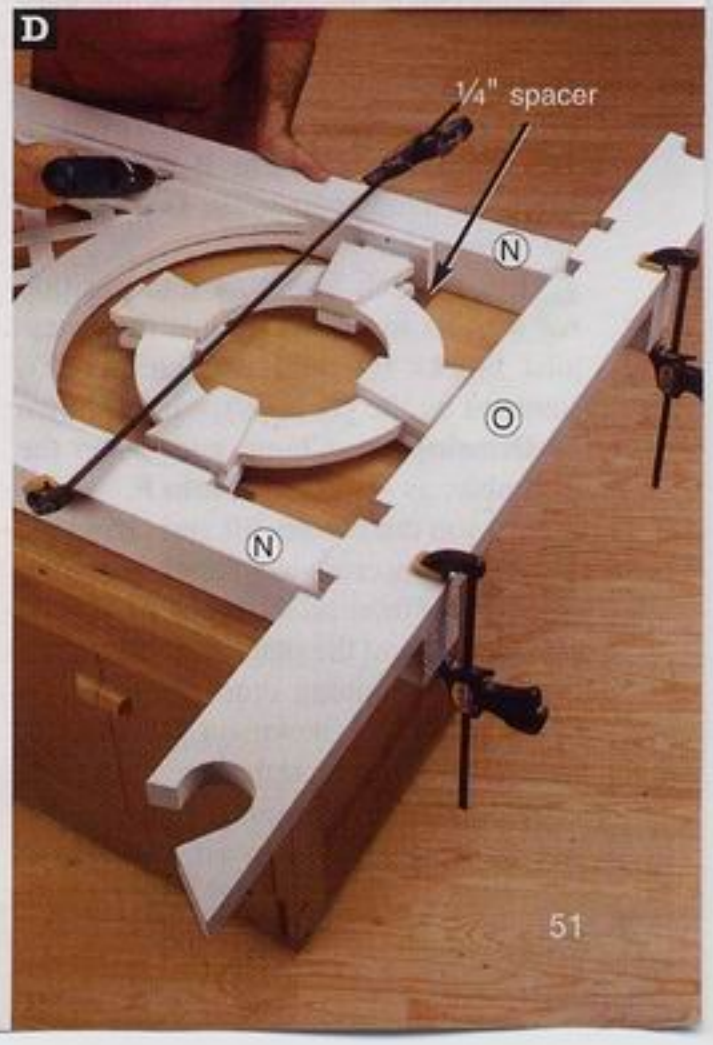


7 JOISTS



MAIN JOIST
(Outside face shown)





where shown on **Drawing 6**, and drive the screws into the posts and ring. (You'll need to angle your drill slightly when drilling the holes in the supports.) Also, screw the joist to the posts. With the aid of a helper, turn the assembly over. Place the opposing main joist (the one without a block) in position, and clamp. As before, drill the holes in the supports, and screw the supports and joist to the posts. Repeat this process to assemble the arbor's other side.

Put in the footings, and install the arbor

***Note**: You'll find the concrete tube forms, anchors, and bolt-down standoffs needed for the footings at home centers. Also, before you dig the footing holes, call the "One Call" phone number for your state or province, and ask to have the buried pipes and wires on your property located and marked. If you can't find the number, call the North American One Call Referral System at 888/258-0808.*

1 Cut a piece of ¼" plywood to 27½×39½" for a marking template. Place the plywood on the ground where you plan to install the arbor, and mark the ground at each corner for the concrete footings.

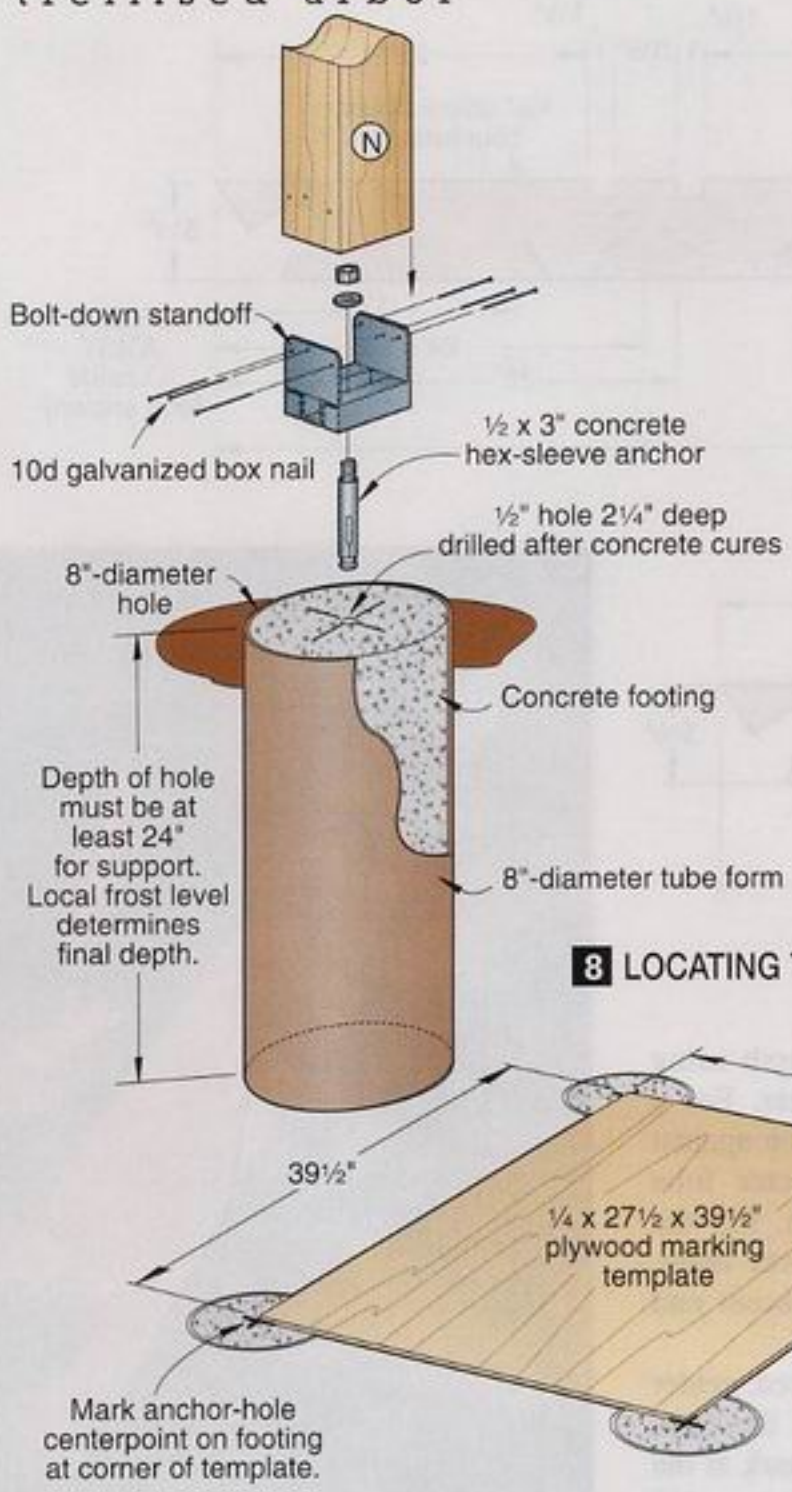
2 Referring to **Drawing 8**, dig 8"-diameter holes centered on the markings to the necessary depth using an auger or a posthole digger. For a neater job and added protection against heaving, place an 8"-diameter tube form in each hole, as shown. Fill the tubes with concrete, and level them. Check for level between adjacent and diagonally opposite footings.

3 When the concrete has cured, center the plywood template on the footings, as shown, and make a mark at the corners on the footings. Using a ½" masonry bit, drill a 2¼"-deep hole in each footing to receive a ½×3" concrete hex-sleeve anchor. Drive an anchor into each hole. (Back off each anchor's nut just enough to protect the bolt's top threads while you drive the anchor.) Mount a bolt-down standoff on each anchor, leaving the anchor's nut loose. Adjust the standoffs' spacing to exactly 24×36" (the spacing between the arbor's posts), then tighten the anchor nuts.

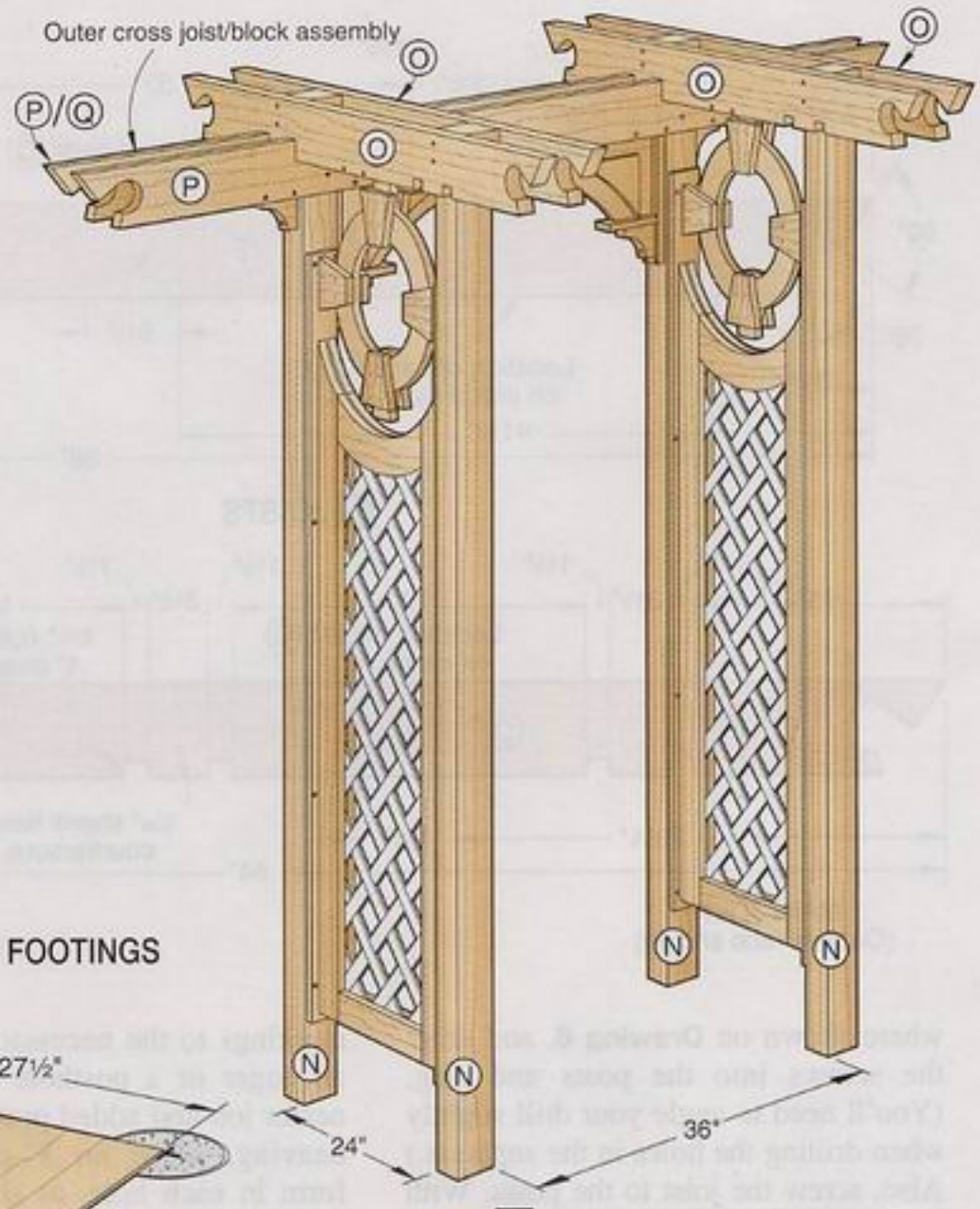
4 Retrieve the cross joists that you set aside earlier. With the aid of two

(Photo C)
Apply a bead of construction adhesive to the joist blocks, clamp them to the joists, and secure with 2½" deck screws.

(Photo D)
With the lattice frame/ring assembly supported on spacers and the posts and joist clamped in position, drive the screws to secure the assembly.


N
Bolt-down standoff
10d galvanized box nail
½ x 3" concrete hex-sleeve anchor
½" hole 2¼" deep drilled after concrete cures
8"-diameter hole
Concrete footing
Depth of hole must be at least 24" for support. Local frost level determines final depth.
8"-diameter tube form
27½"
39½"
¼ x 27½ x 39½" plywood marking template
Mark anchor-hole centerpoint on footing at corner of template.

8 LOCATING THE FOOTINGS



9 JOIST INSTALLATION

helpers, stand the arbor's two side assemblies upright in the standoffs. While your helpers hold the assemblies vertical, lift an outer cross joist/block assembly (P/Q) into position, where shown on **Drawing 9** and as shown in **Photo E**. Clamp the cross joist to the main joists. Do not drive the screws yet.

5 Lift an arch assembly into position with its top flush against the cross-joist blocks (Q) and its brackets (D) centered on the posts (N), where shown on **Drawing 9a**. Clamp and fasten the assembly, as shown in **Photo F**.

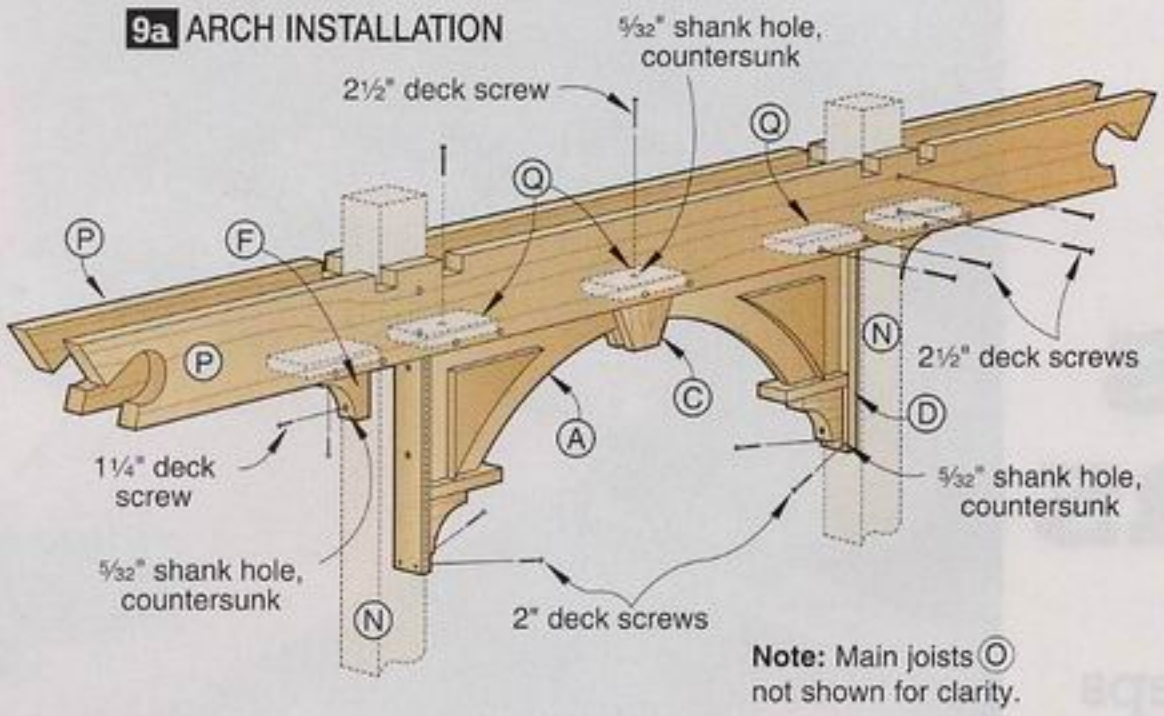
6 As you did before, lift and clamp the remaining cross joist/block assembly (P/Q) in position on the arbor's opposite side, and mount the other arch assembly. Place the remaining cross joists (P) in position, where shown on **Drawing 9**, inserting them through the arbor side assemblies and clamping them to the main joists. Now, screw all of the cross joists to the posts, and screw the inside cross joists to the joist blocks (Q).

7 Finally, retrieve the four corbels (F) that you set aside earlier. Center the corbels on the posts and cross-joist outer blocks, where shown on **Drawing 9a**. Drill countersunk shank holes, where shown, and drive the screws. Drive 10d galvanized box nails through the stand-offs into the posts. Touch up the screw and nail holes with acrylic caulk and paint. (If you use stainless-steel screws, you can omit this step.)

(Photo E)
With the posts captured between the cross joist's outer blocks (Q), raise the joist assembly, and slip its notches into those in the main joists (O).

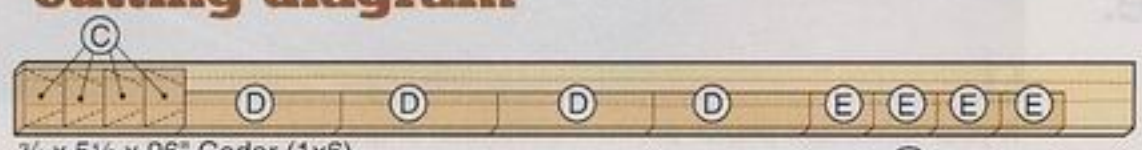
(Photo F)
Clamp the arch assembly to the cross-joist blocks (Q). Screw the blocks to the arch and the brackets to the posts.

9a ARCH INSTALLATION

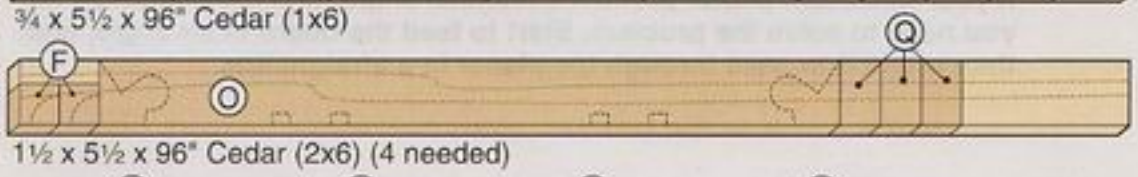


Note: Main joists (O) not shown for clarity.

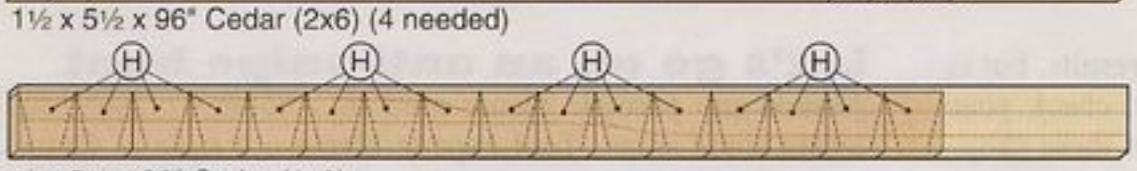
cutting diagram



¾ x 5½ x 96" Cedar (1x6)



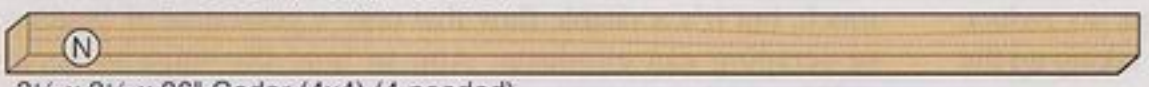
1½ x 5½ x 96" Cedar (2x6) (4 needed)



¾ x 5½ x 96" Cedar (1x6)

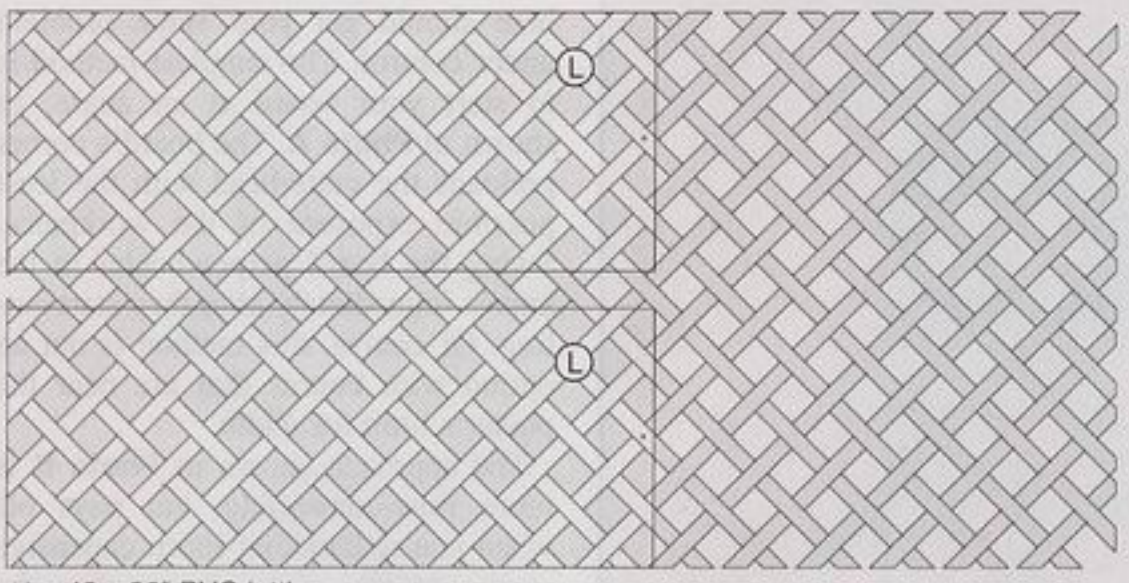
¾ x 7¼ x 96" Cedar (1x8) (4 needed)

¾ x 7¼ x 96" Cedar (1x8) (2 needed)



3½ x 3½ x 96" Cedar (4x4) (4 needed)

1½ x 5½ x 96" Cedar (2x6) (4 needed)



¼ x 48 x 96" PVC lattice

materials list

Arch assemblies	FINISHED SIZE T	W	L	Matl.	Qty.
A arches	¾"	8½"	34½"	P	2
B* trim	¾"	6½"	7"	P	8
C top keys	¾"	5"	3½"	C	4
D brackets	¾"	3"	13½"	C	4
E corbel caps	¾"	3"	5½"	C	4
F corbels	1½"	3½"	3½"	C	8
Ring assemblies					
G rings	¾"	22½"	22½"	P	2
H ring keys	¾"	5"	5"	C	16
Lattice frames					
I stiles	¾"	3½"	64¼"	C	8
J bottom rails	¾"	3½"	15½"	C	4
K* top rails	¾"	6¼"	15½"	C	4
L lattice	¼"	22¼"	56"	L	2
M supports	¾"	3"	73¾"	C	4
Posts and joists					
N posts	3½"	3½"	96"	C	4
O main joists	1½"	5½"	64"	C	4
P cross joists	1½"	5½"	88"	C	4
Q joist blocks	1½"	5½"	3½"	C	12

*Parts initially cut oversize. See the instructions.

Materials key: P–medium-density overlay (MDO) plywood, C–cedar, L–diagonal-pattern PVC lattice.

Supplies: #20 biscuits (16); 4d galvanized finish nails; 10d galvanized box nails; construction adhesive; 1¼", 1½", 2", and 2½" deck screws; #8×1" flathead wood screws (2); ¼×27½×39½" plywood; 8"-diameter tube forms (4); concrete (one 50-pound bag per 1' length of tube form); ½×3" concrete hex-sleeve anchors (4) with mating washers and nuts; bolt-down standoffs (4); acrylic caulk.

Blades and bits: ½" masonry bit.

Written by **Owen Duvall** with **Chuck Hedlund**
Project design: **Bruce Pierce; Jeff Mertz**

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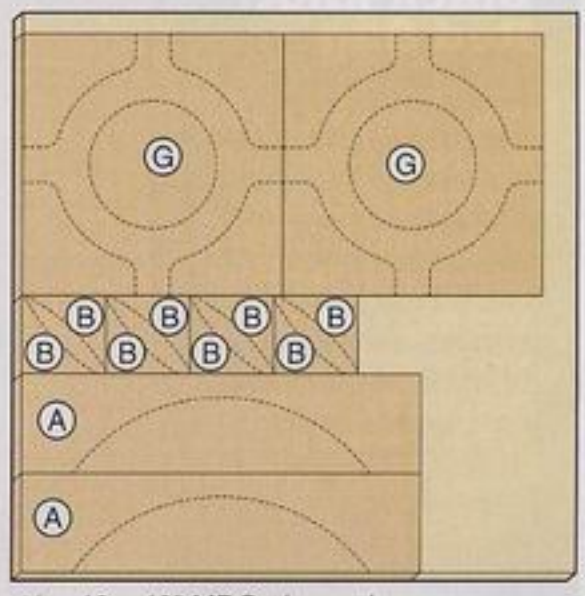


¾ x 48 x 48" MDO plywood

planer tricks & truths

Follow these simple steps for top results every time.

If your thickness planer produces minimal snipe, this trick might be all you need to solve the problem. Start to feed the board at an angle, and then rotate it to pass through the planer in a straight line.

Almost any thickness planer gives quick results, but is yours giving you quality results? If not, check your machine as described here, and then put these shop-proven practices to good use.

For starters, make sure the cutter knives are sharp and properly aligned. Run a piece of stock through it, and measure the thickness of each edge with calipers to determine if the knives are even. Make any needed adjustments.

When planing, take a light cut—no more than 1/32"—on the final pass. And here's a tip we use in the *WOOD*® magazine shop: Lower the cutterhead beyond your desired depth of cut, and then raise it into position. This step helps to reduce snipe—a slight gouge on the ends of boards—by taking up the slack in the cutterhead adjustment threads.

Let's go on an anti-snipe hunt

Almost any portable planer used in a home workshop will create some snipe. Tool experts blame a couple of factors, both related to the pressure rollers that hold the stock flat and feed it through the planer. One problem is that each end of the board can rise up into the cutterhead while it's between the rollers. Also, on some planers, particularly those with only two posts instead of four and those without a locking feature, the cutterhead pivots slightly when the workpiece is applying pressure on only one roller.

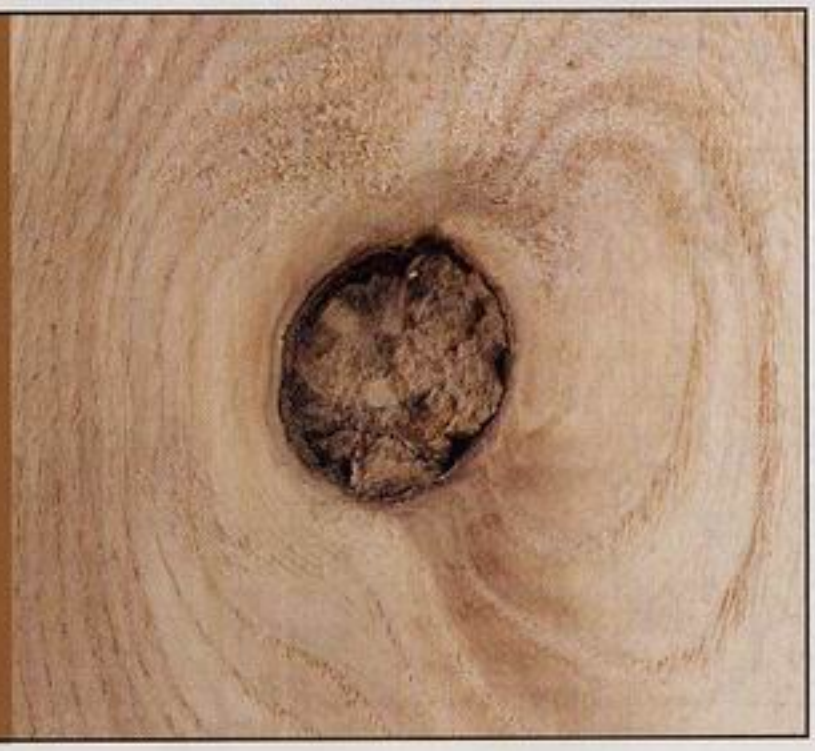
Snipe that's .005" deep, for example, doesn't sound like much, but it's a visible flaw that only a good deal of sanding or scraping can eliminate. Aim to hold the snipe to about .002", which is equal to the thickness of a couple of pages of this magazine. You can make that amount of snipe quickly disappear with light sanding.

One or more of the techniques shown here should get your snipe problem under control. The simplest method is to start your board at an angle, as shown in **Photo A**. The board's corner preloads the cutterhead with the least possible exposure of the workpiece. Swing the board perpendicular to the knives immediately after they start cutting. Of course, this method is not an option with boards that are near the planer's limit for width.

The approach shown in **Photo B** is more time-consuming, but pays off when you're handling short, expensive stock—or any piece shorter than the

Black knot? Red flag

When you spot a knot with black edges and a dried-out appearance, keep it out of your planer. The hard knot might nick your knives, and it can damage the workpiece or the rollers if it breaks loose, as it's likely to do.



Protect short pieces of exotic or figured wood, such as this purpleheart, by taking the time to glue strips to both edges. Rip them away after you finish planing.

To handle a significant snipe problem, run boards end to end through your planer. Place sacrificial scrap stock at the beginning and end of the line of boards.

Cut project parts overlength to allow for snipe, then gang-plane them on edge to achieve equal width.

Plane thin stock with the help of a carrier board. Choose particleboard or medium-density fiberboard for a flat surface.

distance between your planer's rollers. Use scrap equal to the workpiece in thickness, or slightly greater, and about 8" longer. The guide strips receive all of the snipe.

Keep your boards butted together, as in **Photo C**, and only the first and last pieces get sniped. Use scrap pieces at both ends of this parade, and your good stock in between remains snipe-free. In some cases, it helps to have someone assist you in moving the boards from outfeed table to infeed table.

Explore edge-jointing

In addition to face-planing boards to the desired thickness, a planer also can edge-joint several pieces simultaneously to achieve the same width. To do this, cut the pieces slightly oversize on the tablesaw. Then, clean up the tooth marks and make sure the pieces are equal in width with a trip through the planer, as shown in **Photo D**. In this situation, it's easiest to deal with snipe by cutting the pieces slightly overlength. Trim them to final length after planing.

Plane really thin stock

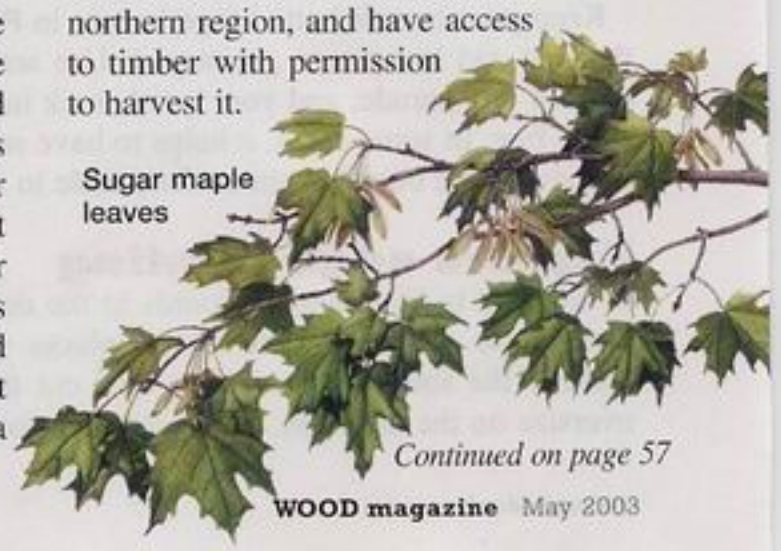
For stock less than ¼" thick, cut a carrier board to fit through your planer, as shown in **Photo E**. Attach your workpiece to the carrier with several strips of cloth-backed, double-faced tape. The carrier eliminates any catching or flexing as the workpiece passes from the infeed table into the planer. Also, if the workpiece shatters under the knives, the carrier board protects the table from damage. Follow this procedure to produce veneer down to ⅛" thick.

make it special with
spalted wood

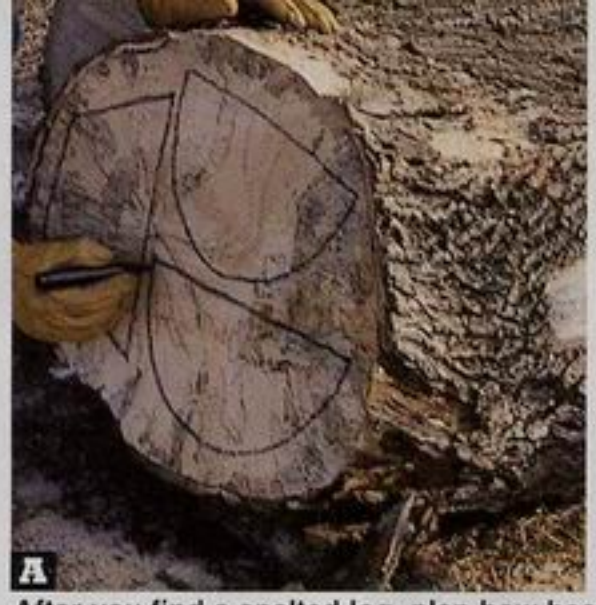
Its fine lines and random patterns lend an exotic look to any project. Here's what you need to know.

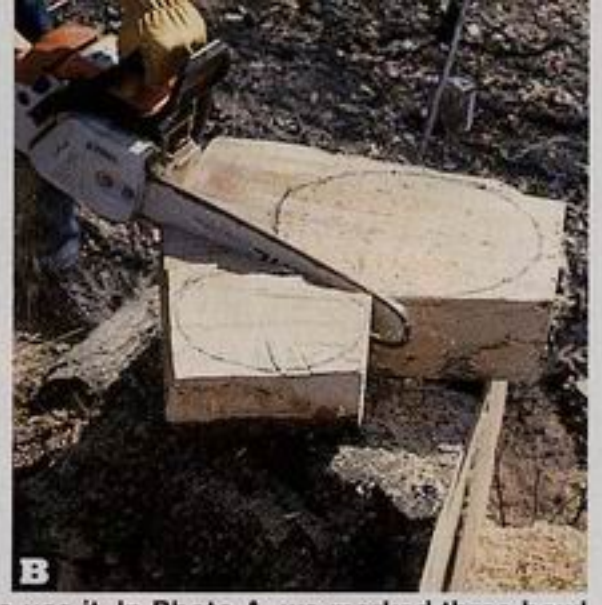
A log on the forest floor, sprouting mushrooms and missing its bark, doesn't look like a source of premium woodworking stock. But it might be a treasure. It might contain spalted wood, marked with a network of random lines that look terrific on projects like those shown *above*.

Spalting occurs in sapwood during the normal decay process, but produces dramatic patterns only in light-colored wood. Birch, beech, and maple are prime candidates for spalting, with hard maple ranking as the most commonly used spalted wood because of its color and its high proportion of sapwood. If your local specialty lumber outlet doesn't carry spalted stock, check mail-order suppliers. You can find several options on the Internet by searching for "spalted wood lumber." Best of all, you might find your own source if you live in a northern region, and have access to timber with permission to harvest it.


Sugar maple leaves

Continued on page 57





After you find a spalted log, plan how best to use it. In Photo A, we marked three bowl blanks, being certain to avoid the unstable pith. After sawing into the end of the log to free those pieces, we cut them closer to finished shape, as shown in Photo B.

Zone lines are completely random in design. Notice the double lines, with eye-catching shading in between.

When hunting for spalted maple, for instance, look for standing maple trees. (See the drawing *opposite page, bottom* to identify the sugar maple leaf.) Chances are good that any nearby fallen trees also are maple. When you find one, cut into the log with a chainsaw to check for spalted areas. Save the best portions, as shown in **Photos A** and **B**.

What causes spalting?

When a tree dies, nature's abundant fungus spores begin the decay process. White rot fungi do much of the work, feeding on wood and moisture. They create spalting's dark "zone lines," shown in **Photo C**, as they move through the wood.

You're most likely to find good spalted wood in cold climates. Decay pauses when temperatures drop below about 35 degrees, creating a longer window of opportunity.

Can you induce spalting in a newly fallen tree? Yes, but it takes patience, and the results are unpredictable. Cut the log into suitably sized pieces, store them on a bed of leaves in a shady spot, and cover them with more leaves. Moisten the pile occasionally if the weather turns dry. Check the wood every so often, but expect to wait at least a year for the desired result.

Or, you can cut small pieces, moisten them, and store them in unsealed plastic bags. Either way, the key is to stop the rotting process before the wood turns soft, or "punky," as shown in **Photo D**. You can call a halt to spalting by placing the wood in a dry place. Kiln drying stops it quickly.

Work it with care

You should avoid breathing all sawdust, of course, but the fungal material in spalted wood creates an extra risk of an allergic-type reaction. "The dust has been known to cause severe respiratory or skin problems in a few cases," says Dr. Eugene Wengert, professor emeritus of wood processing at the University of Wisconsin-Madison.

Use a dust-collection system, and wear a properly fitted dust mask. Those measures should keep you comfortable and safe when you work with spalted wood. Here are some other details to keep in mind while cutting and turning:

- In some situations, you can save a marginal piece by applying cyanoacrylate glue or epoxy to punky areas. Remember, however, that adhesive on the surface can show up as a light-colored or shiny spot after you apply finish. An alternative method for treating very small soft spots: Coat them with shellac or sanding sealer.
- If you cut stock thinner than ½", it might crack along a zone line if sufficient pressure is applied.
- The noticeable variation between hard and soft areas—an extreme example is visible in **Photo E**—can result in a pitted surface when you turn spalted wood. Take extra care to keep your tools sharp, make light cuts, and plan to do more sanding than usual.
- Some spalted wood tends to expand and contract more than unspalted wood. To be safe, if you use spalted wood for floating panels, allow 1/16" more space on each side than normal.

Finishing thoughts

You took pains to find great-looking spalted wood and put its beauty on display. Now, be sure to finish it in a way that will emphasize the striking contrast between light wood and dark lines and preserve it.

We recommend applying lacquer or water-based varnish, two finishes that add little color to wood. However, if you prefer a warmer, more amber look, you can use oil-based varnish or shellac. You might choose polyurethane for items that will receive a lot of use.

Avoid applying oil, such as boiled linseed oil. A good oil finish depends on even absorption into the wood, and spalted wood's extreme variations in density make that unlikely.

Don't expect much from wood in this punky condition. Rather than try to save a flawed piece, search for better stock.

Even though the board is usable, this very soft spot should be cut away to avoid milling and finishing problems.

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ARTS AND CRAFTS

TABLE LAMP

Capture the golden glow of a special era of craftsmanship with this timeless design.

Build this gem from traditional quartersawn oak, or from another wood, such as cherry (above), to match your existing furniture.

For the board feet of lumber and other items needed to build this project, see *page 62*.

Mica panels in a wooden framework, accented with copper pine-cone motifs, make this a lamp that gets noticed. You'll be surprised at how easy it is to cut and assemble the half laps in the lampshade's streamlined framework.

Start with the base

1 Cut the base (A) to the size listed in the Materials List. Mark the centerpoints for the hole locations on its bottom, where dimensioned on **Drawing 1**. Drill the countersunk shank holes and the counterbore with the ½" hole centered inside, where shown. To ensure that the base fits flush against the post (C), see the **Shop Tip**, *below*.

2 Attach a tall auxiliary fence to your tablesaw fence, and install a zero-clearance insert. With the base's bottom flush against the auxiliary fence, bevel-rip the base's ends, then edges, where dimensioned on **Drawing 1a**. Sand the base to 220 grit.

3 From ¾"-thick stock planed to ¼" thick, cut the feet (B) to size. Sand the feet. Align the grain on the feet with the base's grain. Glue and clamp the feet to the base, overhanging its perimeter ⅛", where dimensioned on **Drawings 1** and **1a**.

Fashion the post and lampshade supports

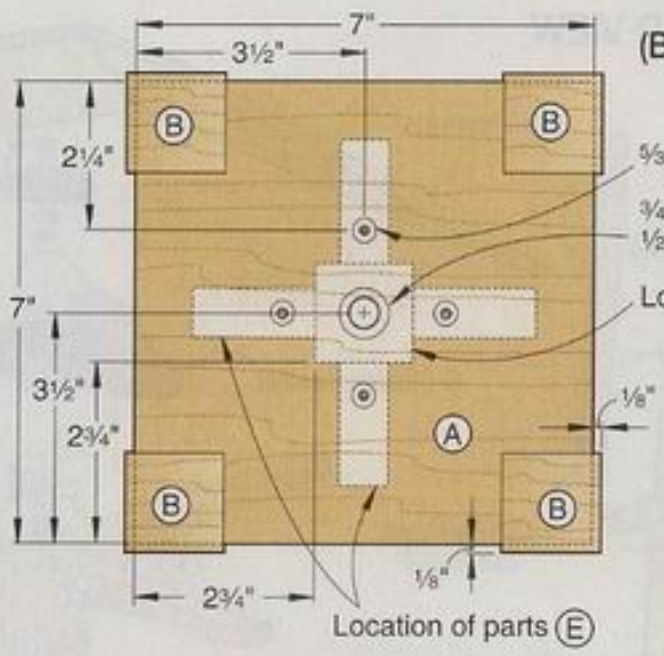
1 From ¾"-thick stock, cut two 1⅝×13½" pieces for the post (C). Using a dado blade in your tablesaw, cut a ⅝" groove 5/16" deep centered along the inside face of each piece, where shown on **Drawing 2**. Glue and clamp the pieces' grooved faces together, keeping their edges flush. Joint one edge of the post. Then, with your thickness planer, plane it to the finished width of 1½", removing equal material from both edges to keep the groove centered. Trim the post to the finished length of 12½".

2 Chuck a ½"×14° dovetail bit in your table-mounted router. Referring to the article on *page 90* for help on making sliding dovetail joints, rout a 5/16"-deep, 1⅛"-long groove centered on all four faces of the post, where shown on **Drawing 2**.

3 Cut the lampshade supports (D) to size. These pieces must be the same thickness to ensure their dovetail tenons fit snugly in the post's grooves. Make four copies of the full-size lampshade support pattern in the *WOOD PATTERNS*® insert. Using spray adhesive, attach a pattern to each support. Form the dovetail tenons on the supports' ends, where shown on the pattern.

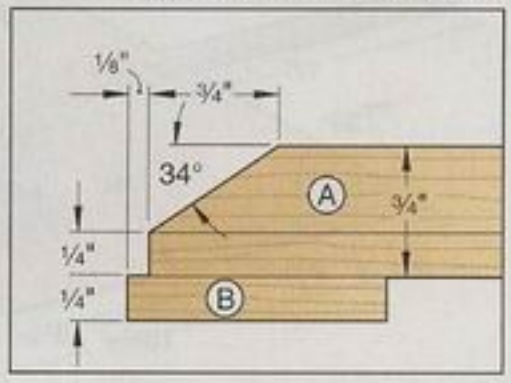
4 Bandsaw the supports to shape. Using a fine-tooth saw, cut off the bottom ¼" of the supports' tenons, where shown on the patterns.

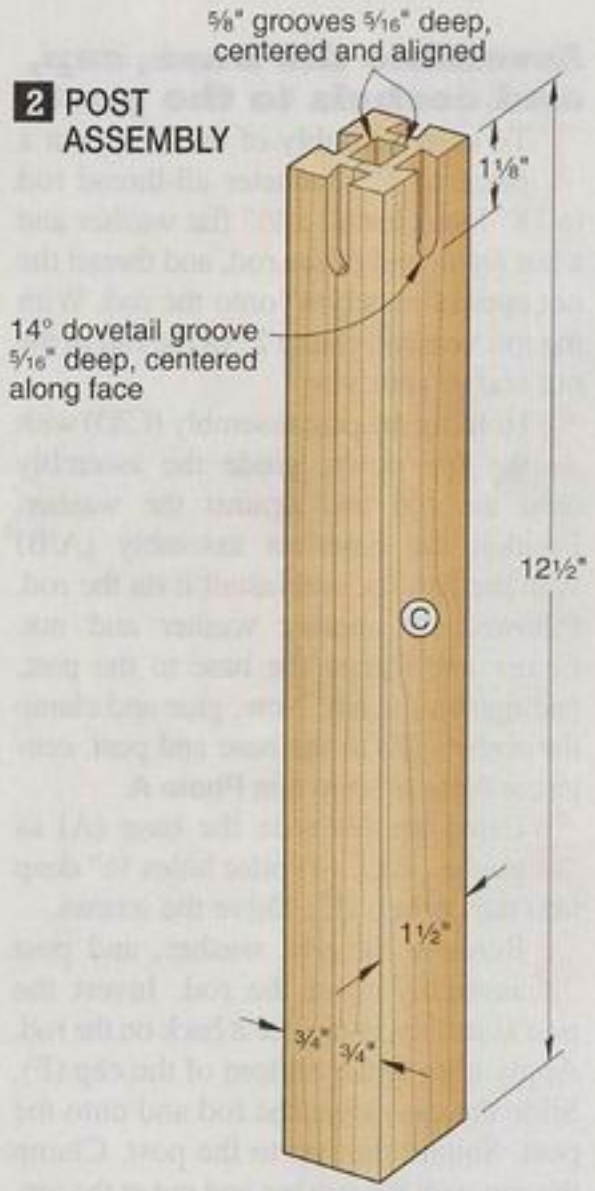
5 Dry-fit the supports in the post's grooves, and verify you can make them flush with the post's top. If not, trim the bottom of the tenons as necessary to achieve a flush fit. Sand the supports smooth. Then, glue them in place.



1 BASE
(Bottom view shown)

1a BASE BEVEL DETAIL





2 POST ASSEMBLY

Add the corbels and cap

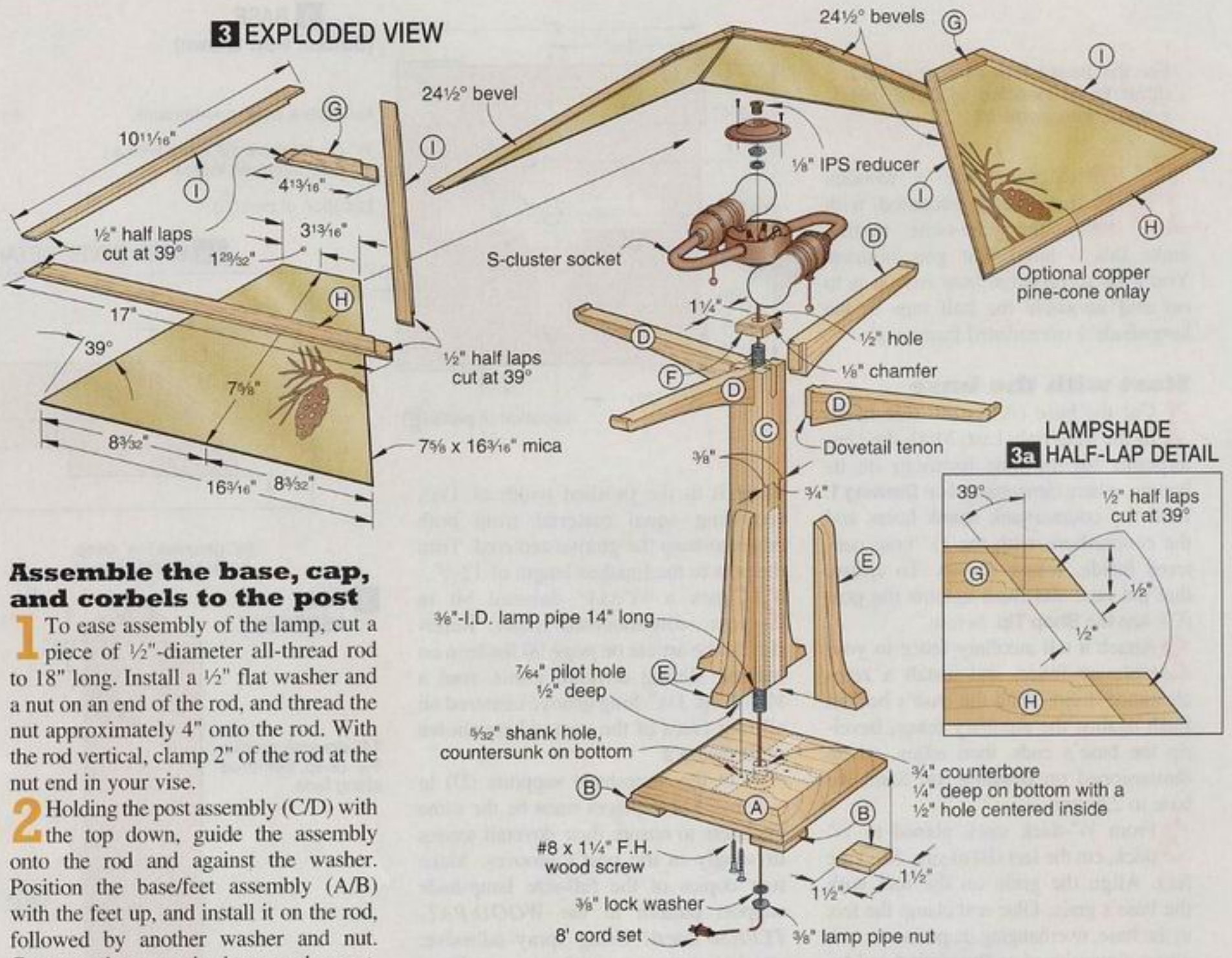
1 Cut the corbels (E) to size. Make four copies of the corbel pattern in the insert. Adhere the patterns to the corbels. Bandsaw and sand them to shape.

2 From ¾"-thick stock planed to ⅜" thick, cut the cap (F) to size. Using your drill press, drill a centered ½" hole through the cap. Chamfer the cap's edges, where shown on **Drawing 3**, by hand-sanding.

SHOP TIP

Countersink for a perfect fit

Here's a simple way to make certain parts mate tightly when screwed together. After drilling the holes in a part, such as in the lamp base (A), countersink the holes on the opposite side. This removes any raised material around the holes, and it provides room to receive wood fibers crushed and pulled out when driving the screws.



Assemble the base, cap, and corbels to the post

1 To ease assembly of the lamp, cut a piece of ½"-diameter all-thread rod to 18" long. Install a ½" flat washer and a nut on an end of the rod, and thread the nut approximately 4" onto the rod. With the rod vertical, clamp 2" of the rod at the nut end in your vise.

2 Holding the post assembly (C/D) with the top down, guide the assembly onto the rod and against the washer. Position the base/feet assembly (A/B) with the feet up, and install it on the rod, followed by another washer and nut. Center and square the base to the post, and tighten the nut. Now, glue and clamp the corbels (E) to the base and post, centering them as shown in **Photo A**.

3 Using the holes in the base (A) as guides, drill 7⁄64" pilot holes ½" deep into the corbels (E). Drive the screws.

4 Remove the nut, washer, and post assembly from the rod. Invert the post assembly, and place it back on the rod. Apply glue to the bottom of the cap (F). Slide the cap down the rod and onto the post. Square the cap to the post. Clamp the cap with the washer and nut at the top. When the glue dries, remove the assembly from the rod.

Move on to the lampshade frames

1 Cut the lampshade top rails (G), bottom rails (H), and stiles (I) to size, and form the mitered half laps on their ends, where dimensioned on **Drawings 3** and **3a**. For a surefire method to safely and accurately machine these parts, see the article on *page 14*.

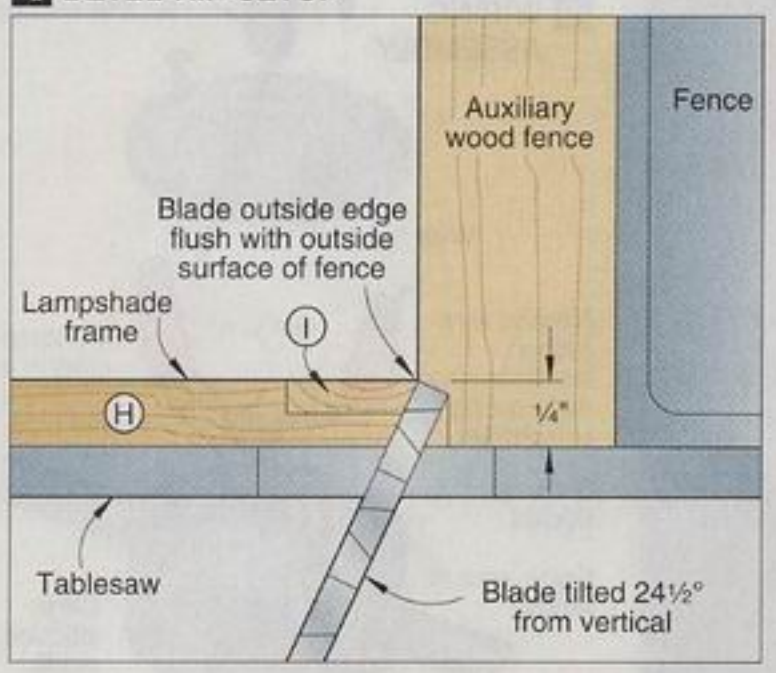
2 Glue and clamp the top rails, bottom rails, and stiles together, forming four flat frames. When dry, sand the joints smooth.

3 Referring to **Drawing 4**, attach a sacrificial auxiliary wood fence to your tablesaw fence. Angle the blade as shown, and set it below the table surface. Position the auxiliary fence over the blade where shown. Start the saw. Slowly raise the blade, cutting into the fence. Adjust the blade height and fine-tune the fence position, as needed, to place the blade's outside edge flush with the wood fence, where shown. Place a frame face-up on the saw, as shown on **Drawing 4a**. Bevel-rip the edges of both stiles (I). Repeat for the remaining frames.

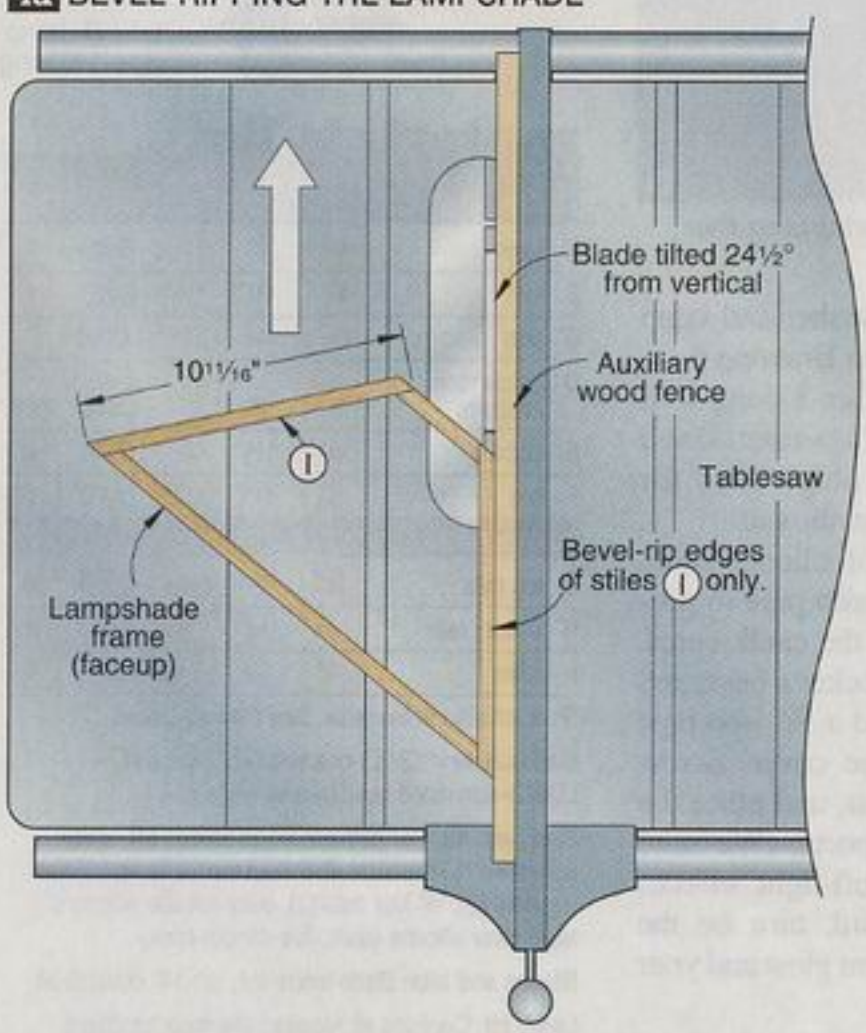
4 Apply a thin coat of glue to the stiles' beveled edges. On a flat surface, assemble and clamp the frames together, as shown in **Photo B**. If you have only a few small clamps, don't worry. You can glue the lampshade together in stages, assembling one corner at a time.

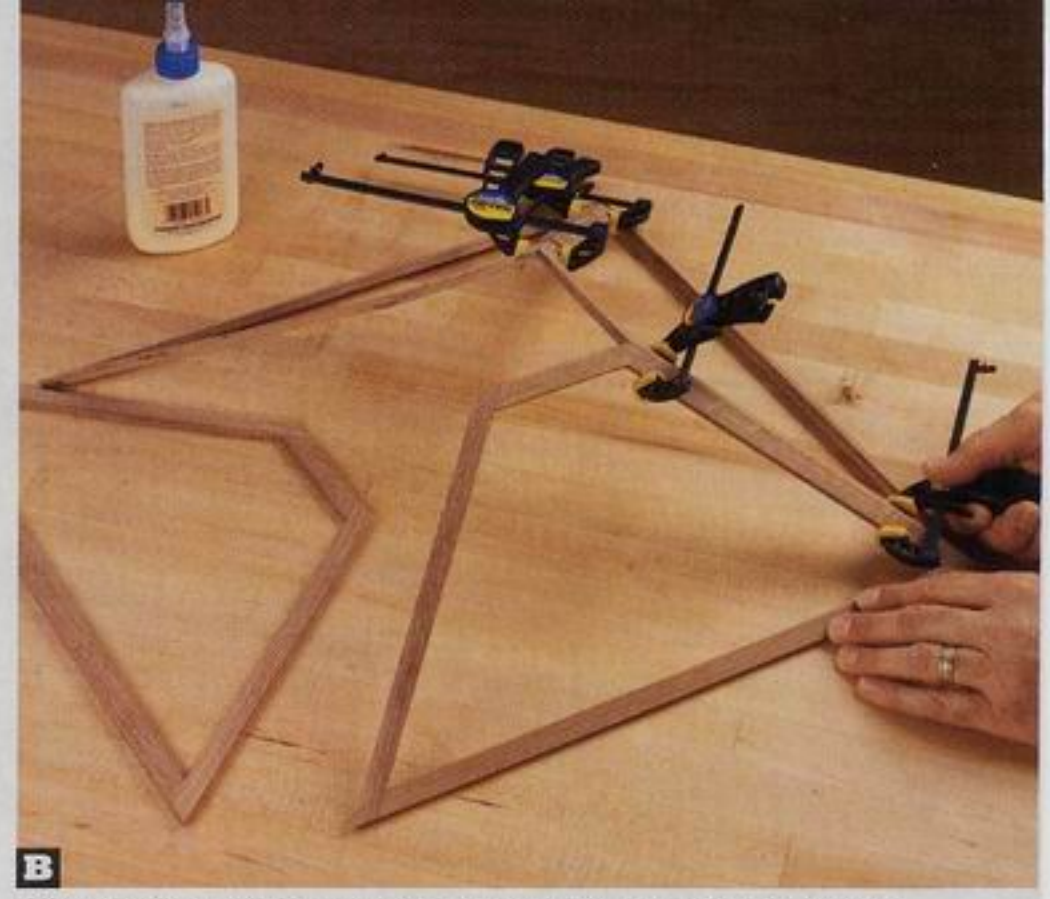
Use an adjustable square to center the corbels on the post. Check for an equal ⅜" measurement from the face of the corbel to the edge of the post.

4 BEVEL-RIP SETUP



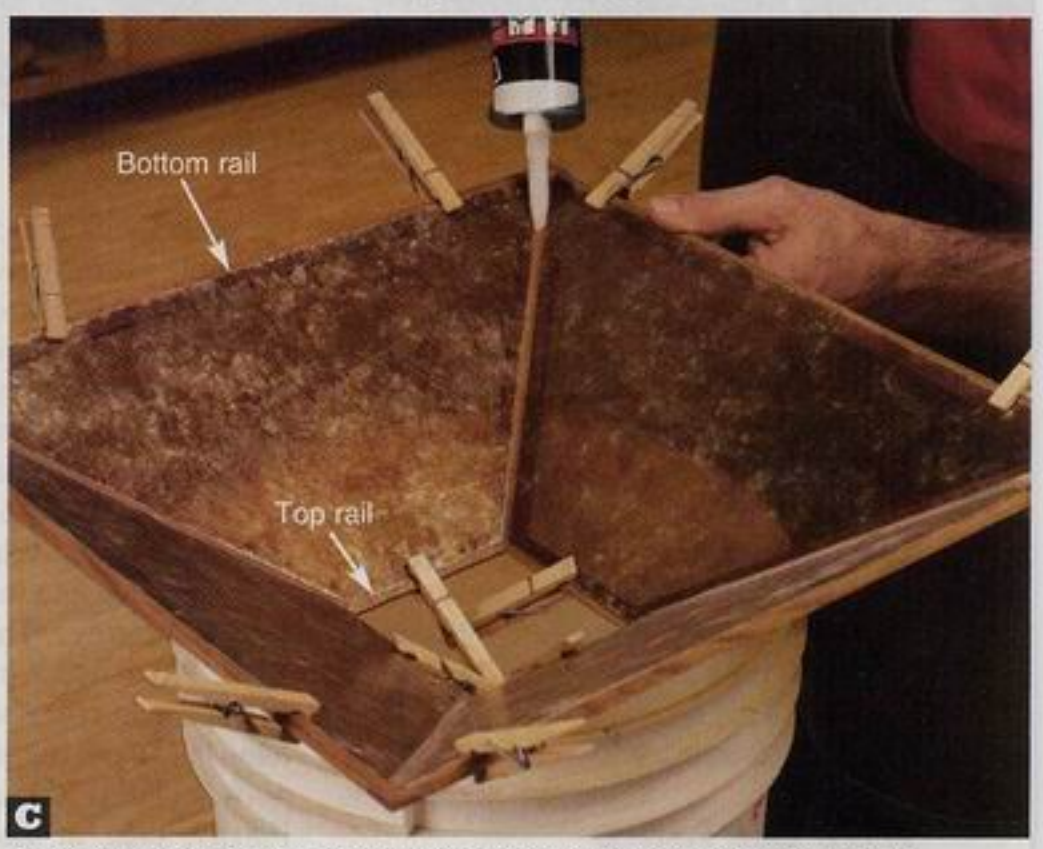
4a BEVEL-RIPPING THE LAMPSHADE





B

Align the frames' top and bottom edges, and verify a tight joint between the stiles. Then clamp the stiles together.



C

Center and clamp the mica to the frames with clothespins. Caulk along the stiles, working from the top to bottom rails.

Time for the finish

1 Look over the post assembly and the lampshade frame assembly and sand any areas that need it.

2 Apply a stain if you wish. (We used ZAR's Oil-Based Wood Stains, no. 116 Cherry for the cherry lamp and no. 114 Provincial for the oak lamp.) Apply three coats of a clear finish, sanding to 320 grit between coats.

Complete the lampshade

1 On an 18×36" mica sheet, lay out four lampshade panels to the dimensions shown on **Drawing 3**. (See the Buying Guide at the end of this article for our source, or purchase it separately from Woodworker's Supply. Call 800/645-9292, or go to www.woodworker.com.) Cut the panels to shape on your bandsaw or tablesaw.

Why mica? It looks great, and it's safe.

It's hard to beat mica for a lampshade material. Besides its warm, amber translucence, it's nonflammable, resisting temperatures up to 1,650 degrees Fahrenheit.

2 Place the lampshade frame assembly bottom up on a 5-gallon bucket, as shown in **Photo C**. Position and secure the mica panels to the inside of the lampshade frames, as shown. (Do not use tape as it will damage the mica when removed.) Apply a thin bead of clear silicone caulk along the corners formed by the adjoining stiles (I), as shown. Smooth the bead so it overlaps the edges of the panels about 1/16". Let the silicone cure overnight.

3 Mask the bottom edge of the bottom rails (H) with easy-release painter's tape. Caulk along the inside of the rails and smooth the bead, as shown in **Photo D**.

Caulk along the inside edge of the bottom rails. Smooth the bead, overlapping the mica panels' edges 1/16".

Immediately remove the tape, and run your finger along the edges to remove any stray silicone. If needed, reattach the clothespins to keep the panels flush to the frames. When the caulk cures, repeat the process for the top rails (G).

4 To cut the optional copper pine-cone onlays for the lampshade, see the article on *page 17*. Using a glue brush, apply five-minute epoxy sparingly to the back of the onlays. Press them onto adjacent mica panels at opposite corners of the lampshade, positioning them where shown on **Drawing 3**.

Wire the lamp

1 Referring to **Drawing 3**, insert a 3/8"-inside diameter, 14"-long lamp pipe through the post's groove. Position the pipe flush with the bottom of the base (A). Install a 3/8" lock washer and 3/8" lamp pipe nut on the pipe's bottom. Remove the cover from an S-cluster socket. Thread the socket onto the top of the pipe, flush against the cap (F). Secure the socket with a lock washer and lamp pipe nut, where shown on **Drawing 5**.

2 Feed the free end of an 8'-long cord set through the pipe's bottom. Use a cord with a polarized plug. Wire the lamp in the configuration shown.

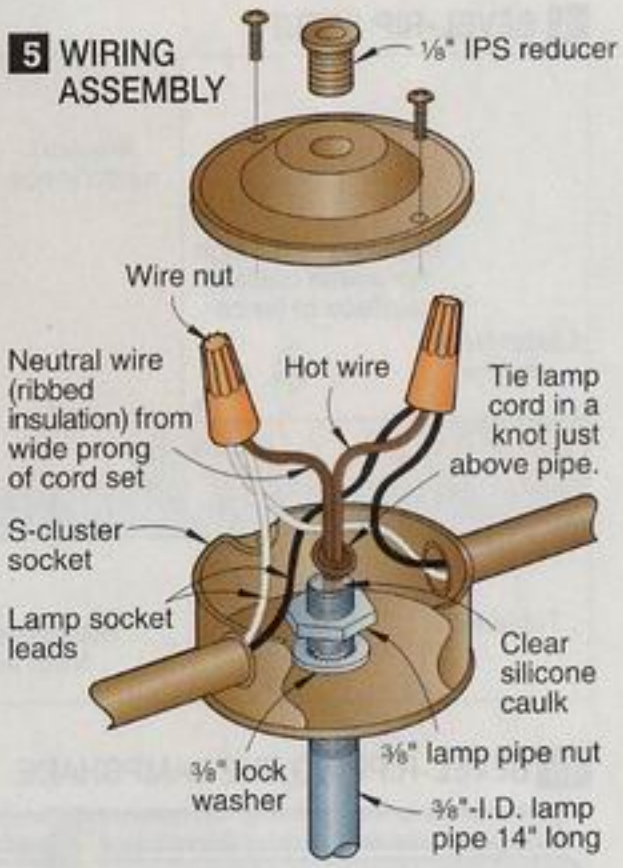
3 Apply a small dab of silicone caulk in each end of the lamp pipe to protect the cord set. When the caulk cures, tuck the wires into the socket's base, and replace the cover. Thread a 1/8" iron pipe size (IPS) reducer in the cover. Screw two bulbs into the sockets, and place the lampshade on the supports. (We used 40-watt bulbs for a soft-light effect.) Finally, plug in the cord, turn on the lamp, and admire its warm glow and your craftsmanship.

Written by **Owen Duvall** with **Chuck Hedlund**
Project design: **Kevin Boyle**

See more . . .

...Mission furniture plans at
www.woodstore.woodmall.com/misfur.html

5 WIRING ASSEMBLY


1/8" IPS reducer
Wire nut
Neutral wire (ribbed insulation) from wide prong of cord set
Hot wire
Tie lamp cord in a knot just above pipe.
S-cluster socket
Lamp socket leads
Clear silicone caulk
3/8" lamp pipe nut
3/8" lock washer
3/8"-I.D. lamp pipe 14" long

materials list

Lamp	FINISHED SIZE T	W	L	Matl.	Qty.
A base	¾"	7"	7"	QWO	1
B feet	¼"	1½"	1½"	QWO	4
C* post	1½"	1½"	12½"	LQWO	1
D lampshade supports	¾"	2"	8¼"	QWO	4
E corbels	¾"	1⅜"	6⅝"	QWO	4
F cap	⅜"	1¼"	1¼"	QWO	1
Lampshade					
G top rails	¼"	½"	41⅜₁₆"	QWO	4
H bottom rails	¼"	½"	17"	QWO	4
I stiles	¼"	½"	10¹¹⁄₁₆"	QWO	8

*Part initially cut oversize. See the instructions.

Materials key: QWO–quartersawn white oak, LQWO–laminated quartersawn white oak.

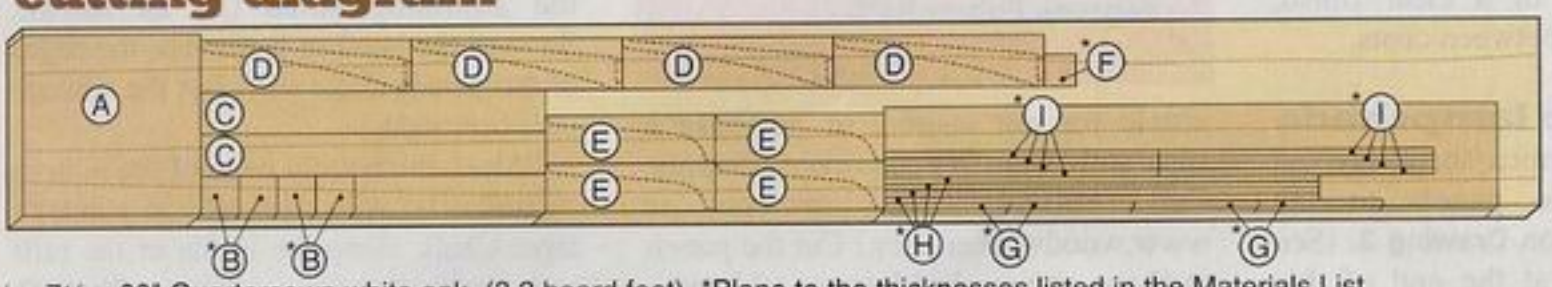
Supplies: #8×1¼" flathead wood screws (4), spray adhesive, ½"-diameter all-thread rod 18" long, ½" flat washers (2), ½" hex nuts (2), easy-release painter's tape, clear silicone caulk, five-minute epoxy.

Blades and bits: Dado-blade set, ½"×14° dovetail bit.

Lamp kit. Contains all required electrical hardware (except bulbs) for one lamp; mica sheets cut to finished size (4); 4×14", 24-gauge copper sheet (1). Order kit no. LMP, $64.95 ppd., from Schlabaugh and Sons Woodworking. Add $54.95 for each additional kit. Call 800/346-9663, or go to www.schsons.com to order.

Lumber kit. Enough quartersawn white oak or cherry (some pieces cut slightly oversize) for one lamp. Order kit no. LP-5OAK for oak or LP-5CH for cherry, $34.95 ppd. Add $29.95 for each additional kit. See above for Web address and telephone number.

cutting diagram



¾ x 7¼ x 60" Quartersawn white oak (3.3 board feet) *Plane to the thicknesses listed in the Materials List.

porch or patio

candle lanterns

Discover a clever method for cutting half-lap joints safely and accurately with this fun and practical project. You can mix and match three heights to suit your style.

Note: Buy glass before you make the lanterns so you can size the base rabbet. (We used ⅛" cord glass.) To build the three different size lanterns, have your glass dealer cut four 3¹¹⁄₁₆"-wide pieces each to 3¾", 4¾", and 5¾" long.

Make a jig first, then the stiles and rails

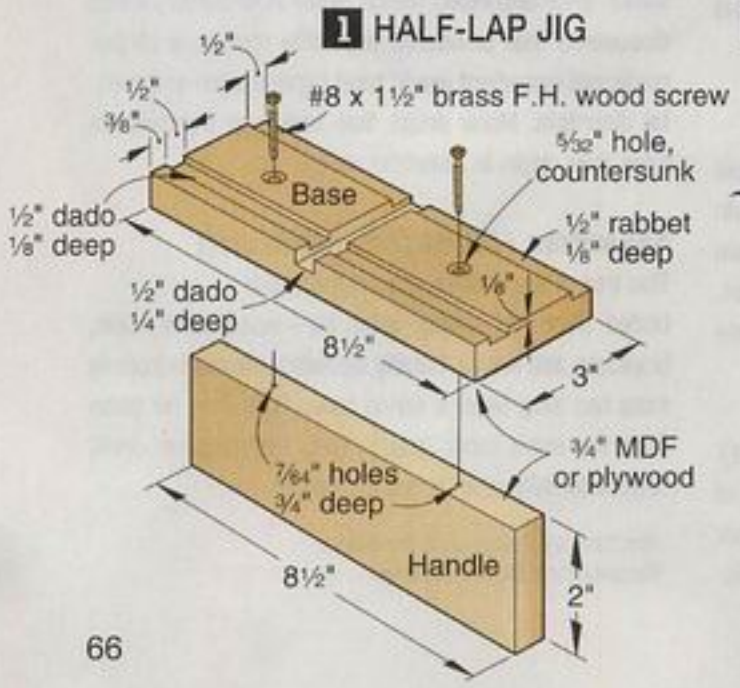
1 Make the half-lap jig shown on **Drawing 1** to cut the ends of the stiles (A) and rails (B).

2 Resaw and plane stock to ¼" thick for the stiles and rails. The stock thickness must equal the depth of the center dado in the half-lap jig for accurate joints. Rip the stock into ½"-wide strips. (You'll need about 21 feet of ¼×½" stock for the three lanterns shown.)

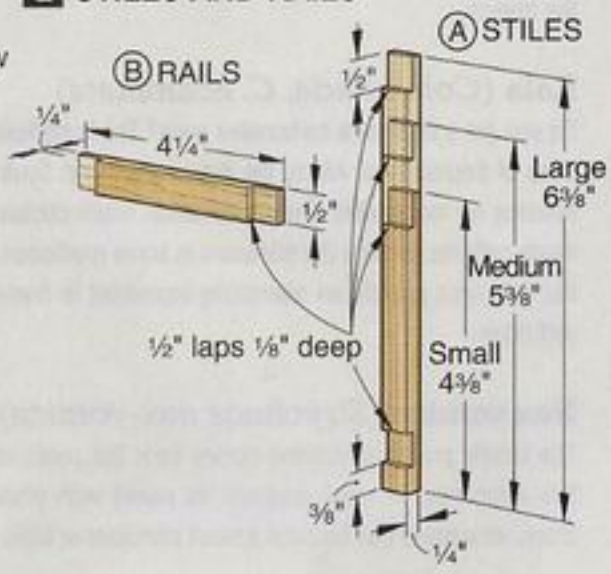
3 Crosscut the stiles (A) and rails (B) to the lengths listed in the Materials List.

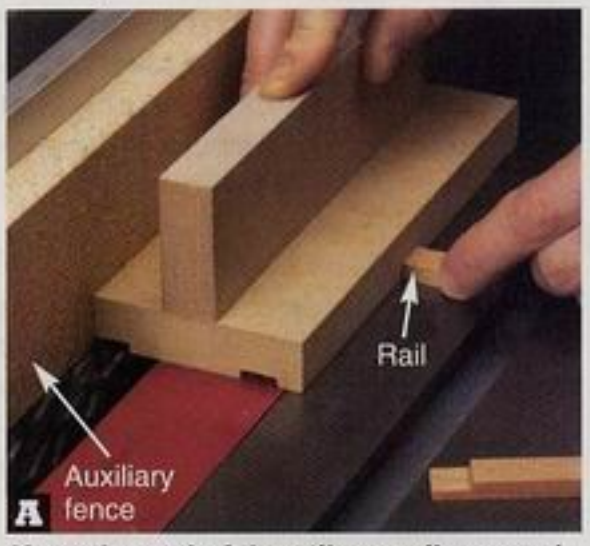
4 Install a ½" dado blade in your saw, and add an auxiliary fence. Locate the fence next to the dado set. Now, lay a stile (A) into the dado in the half-lap jig. Place the jig facedown on the saw table with the rabbeted edge against the auxiliary fence, trapping the stile against the table. Push the stile against the fence. Cut a half lap on one end of each stile, and both ends of each rail, where shown on **Drawing 2** and as shown in **Photo A**. Reset the fence, rotate the jig, and cut the half laps on the lower end of each stile.

1 HALF-LAP JIG

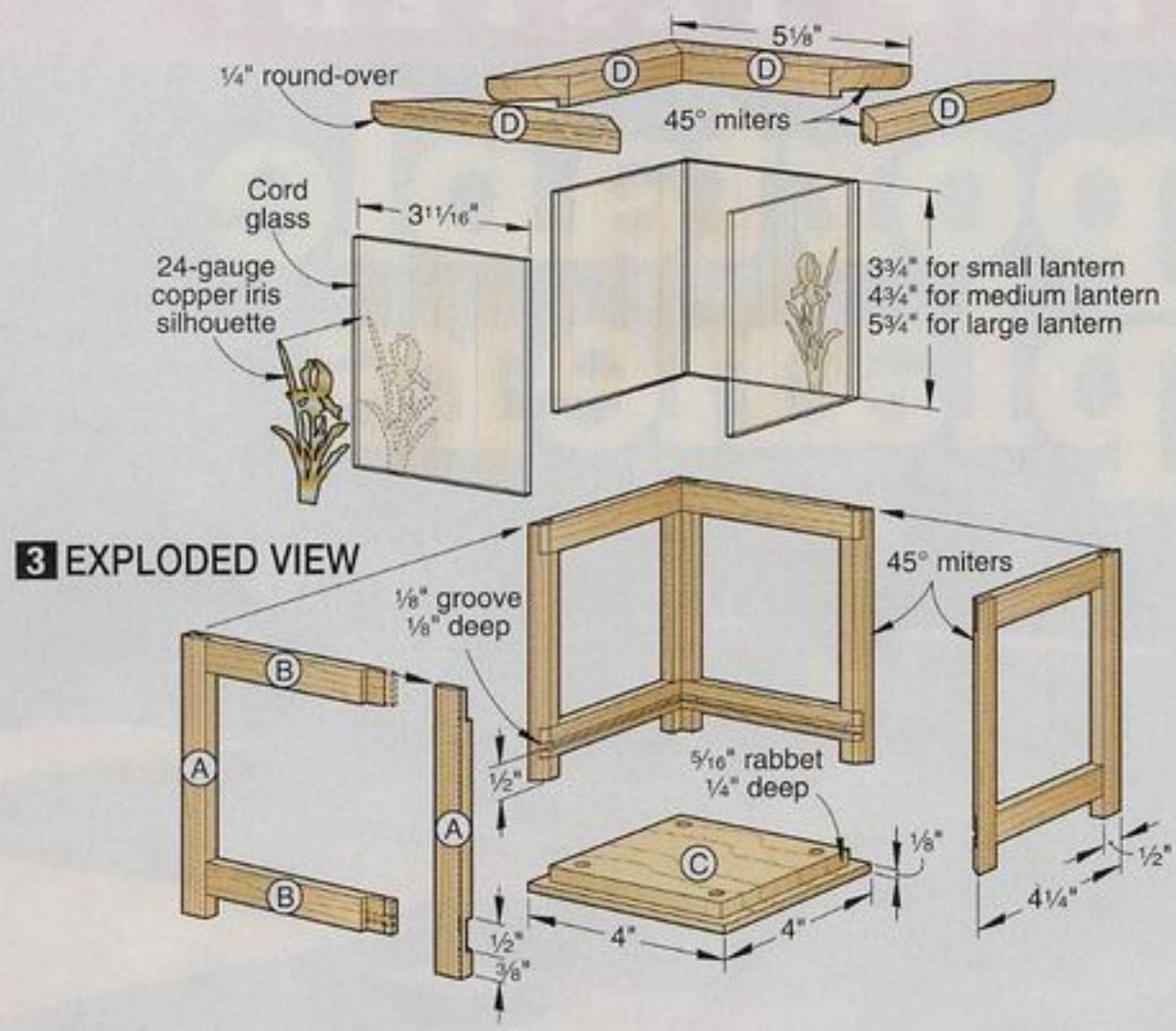


2 STILES AND RAILS



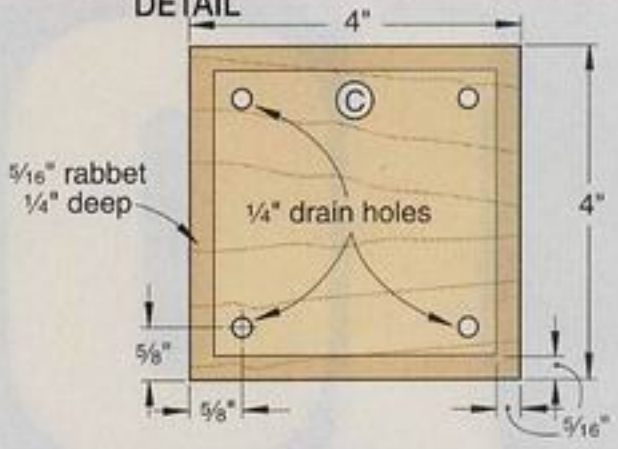


Keep the end of the stile or rail pressed against the saw fence when you cut the half laps.

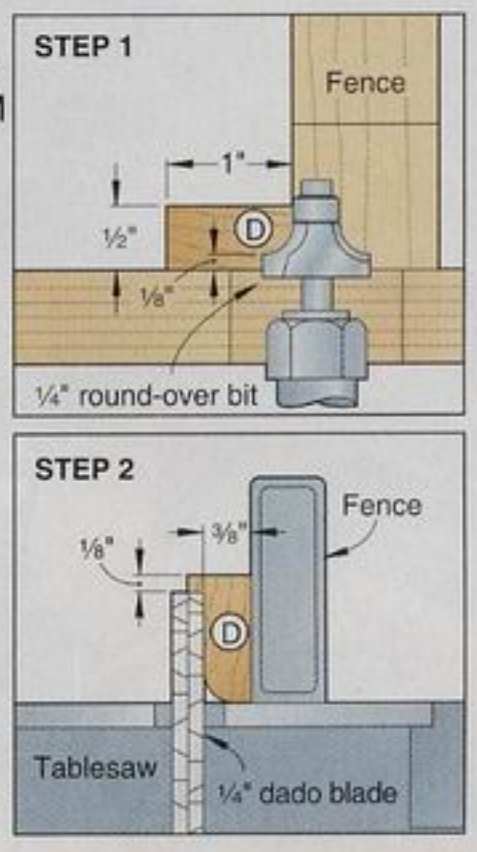


3 EXPLODED VIEW

3a BASE DETAIL



4 TOP TRIM



Assemble the sides

1 Referring to **Drawing 3**, glue and assemble the four sides for each lantern, keeping each side square.

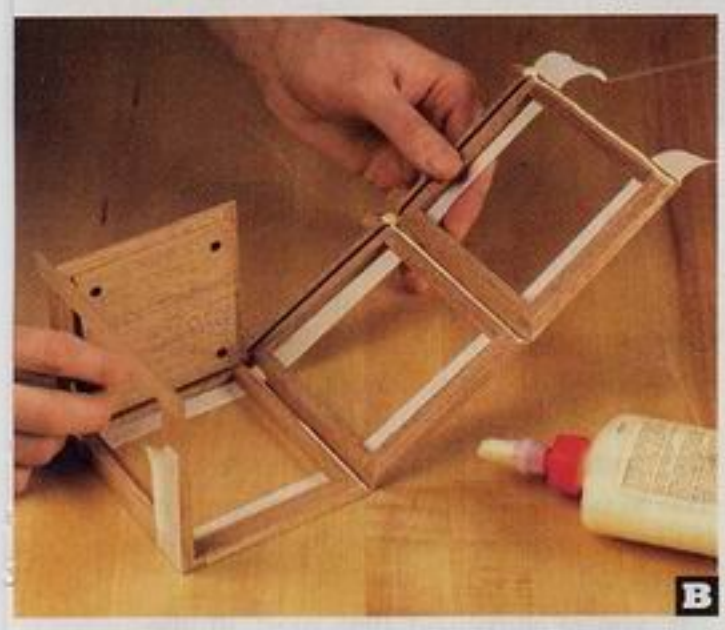
2 Cut a ⅛" groove ⅛" deep in each side assembly, where shown on **Drawing 3**.

3 Bevel both edges of each side to 45°. (We beveled the edges with a router table and 45° chamfer bit.)

Make the bases

1 Cut the bases (C) to size. Cut the rabbets, where shown on **Drawings 3** and **3a**. Make the width of the rabbets 5⁄16" plus the thickness of the glass.

2 Drill four ¼" drainage holes in each base where shown on **Drawing 3a**.



Wrap the sides around the base (C) and secure with strips of masking tape. Glue the miters, but don't glue the base into the grooves.

Glue up the lanterns, and make the trim

1 Lay four assembled lantern sides side-by-side on the workbench with the grooved and mitered faces down. Put strips of masking tape across them at the top and the bottom. Carefully flip the taped assemblies over.

2 Apply glue to the sides' beveled edges. Place the tongue of the base (C) into the groove in one side (don't glue) and wrap the other sides around the base, as shown in **Photo B**. Similarly assemble the other two lanterns.

3 Cut three ½×1×24" pieces of stock for the top trim (D). Rout a ¼" round-over on one edge of each piece, as shown in **Step 1** of **Drawing 4**.

4 Rabbet the stock with your tablesaw, as shown in **Step 2**.

5 Miter-cut the trim pieces (D) to length. Install the glass in the lantern, and dry-fit the trim pieces. The trim's ⅛" lip fits inside the glass. Glue and clamp the top trim frame together.

6 Cut out the copper iris motifs, using the patterns on the *WOOD PATTERNS*® insert, and the instructions on *page 17*.

Finish the parts, and install the glass

1 Sand all the parts. Apply a clear, exterior finish.

2 Slide the glass into the base grooves, smooth side out. Epoxy a top trim assembly in place.

3 Apply a dab of quick-set epoxy to the back of each iris cutout. Now, position the iris cutouts on opposite corners of the lantern.

4 Set a votive candle at the base's center. A long fireplace match or a butane fire lighter makes lighting the wick easy.

Written by **Larry Johnston**
Project design: **Kevin Boyle**
Illustrations: **Mike Mittermeier; Lorna Johnson**
Photographs: **Marty Baldwin**

materials list

Part	FINISHED SIZE T	W	L	Matl.	Qty.
A* small lantern stiles	¼"	½"	4⅜"	M	8
A* medium lantern stiles	¼"	½"	5⅜"	M	8
A* large lantern stiles	¼"	½"	6⅜"	M	8
B* rails	¼"	½"	4¼"	M	24
C bases	⅜"	4"	4"	M	3
D* top trim	½"	1"	5⅛"	M	12

*Parts initially cut oversize. See instructions.

Material key: M–mahogany.

Supplies: #8×1½" brass flathead wood screws; cord glass, four pieces each 3¹¹⁄₁₆×3¾", 3¹¹⁄₁₆×4¾", 3¹¹⁄₁₆×5¾"; quick-set epoxy; 24-gauge×4×10" copper.

Bits and blades: Stack dado set, ¼" round-over and 45° chamfer router bits.

WORKSHOP TESTED!

10 portable planers

When the dust settled after running hundreds of board feet of wood through these ten models, one machine stood proud as our Top Tool.

We used colored chalk to visualize ripples on the surface of a planed board, then slid the board under a table-mounted dial indicator to measure snipe depth.

Hard to believe, but it's been nearly 20 years since Ryobi introduced the first affordable portable planer, a 10"-capacity model called the AP-10. From that humble beginning emerged a category of woodworking power tools that each year grows in terms of models, features, and capacity. We use a portable planer in the *WOOD*® magazine shop nearly every day. But if you haven't yet taken the plunge—or if it's time for you to upgrade—read on to find out what you've been missing.

Putting the planers through their paces

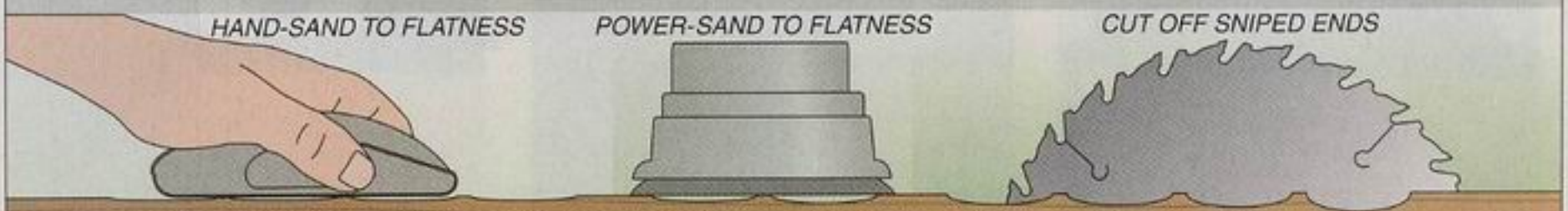
When we asked woodworkers what qualities they value most in a portable planer, they spoke loud and clear. Power, low snipe, and good cut quality that didn't require extensive sanding ranked high, as did knife-changing ease and effective dust collection. We tested for all of those things and more while putting the machines through a month's worth of regular use. Here's what we found.

■ **Power.** To measure the mettle of these machines, we planed 5"- and 12"-wide red oak boards, taking the deepest cut the planer could handle without stalling. Note: Don't try this at home! In hardwoods, we recommend planing no more than 1/16" using sharp knives, and even less with "experienced" ones. (We conducted this test after the knives had lost some of their factory sharpness.) The Maximum Depth of Cut columns in the chart on *page 73* show the results of our tests.

If you're surprised that most of the machines maxed out at the same cutting depth on both 5" and 12" stock, there's

DEALING WITH SNIPE

Snipe is the almost-inevitable scoop near the beginning and end of each cut made on a thickness planer. Some planers snipe less than others, and your options for dealing with snipe vary from lightly sanding it away to cutting it off completely, depending on the depth. To measure the difference, we planed away 1/16" from 7"-wide red oak and pine boards, then measured the depth of the snipe with a dial indicator. Here's how the planers fared (average of five tests on both infeed and outfeed snipe in test boards).



OAK	.0008" RIDGID TP1300LS	.0009" DELTA TP400LS	.0013" DELTA 22-580	.0015" JET JWP-12DX	.0023" CRAFTSMAN 21743	.0031" CRAFTSMAN 21722	.0038" MAKITA 2012NB	.0043" GRIZZLY G1017	.0052" GRIZZLY G8794	.0071" RYOBI AP1300
PINE	.0013" MAKITA 2012NB	.0015" CRAFTSMAN 21743	.0015" DELTA 22-580	.0020" JET JWP-12DX	.0031" CRAFTSMAN 21722	.0037" DELTA TP400LS	.0045" GRIZZLY G1017	.0045" RYOBI AP1300	.0078" RIDGID TP1300LS	.0083" GRIZZLY G8794

Barely discernible to eye. Sand away by hand or with palm sander.

Visible to eye. Sand away with random-orbit sander.

Serious snipe. Make workpieces oversize, and cut off sniped area. Minimize sniping with light cuts, especially on final passes.

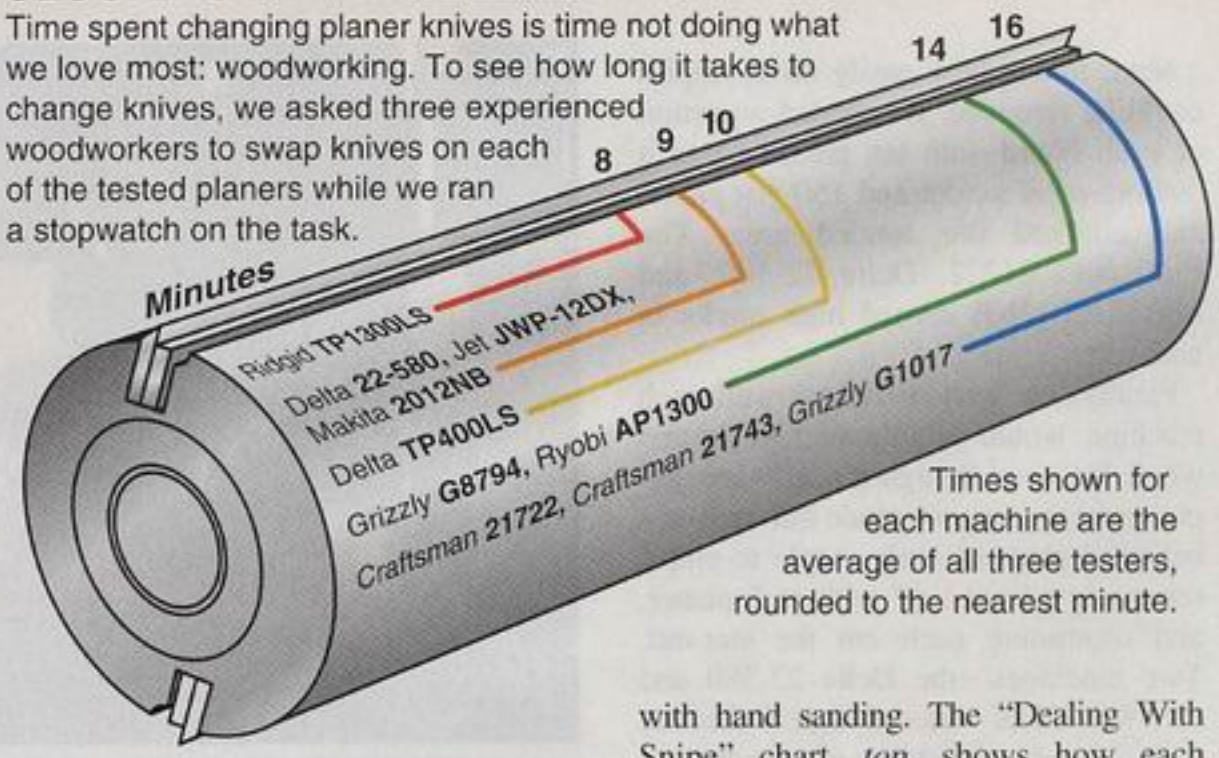
a good reason. Those machines are limited by the design of the head rather than the power of their motors—the front lip of the housing prevents you from fitting in a board that might overtax the motor.

The Grizzly G1017 cut deepest at 5/32" in both 5" and 12" oak stock; Craftsman's 21722 couldn't plane more than 1/32" from the 12" board because a small center tab on the lip of the housing limits deeper cuts to 5"-or-narrower boards that can fit on either side of the tab.

■ **Low snipe.** Those frustrating scoops at the beginning and end of a planed board are the bane of woodworkers and planer manufacturers alike. We tested for snipe by planing 1/16" from the surface of 3/4×7×18" pine and red oak boards. As each board came out of the planer, we measured infeed and outfeed snipe using a dial indicator, as shown in the photo *opposite*.

CLOCKING KNIFE CHANGES

Time spent changing planer knives is time not doing what we love most: woodworking. To see how long it takes to change knives, we asked three experienced woodworkers to swap knives on each of the tested planers while we ran a stopwatch on the task.



Times shown for each machine are the average of all three testers, rounded to the nearest minute.

Although none of the planers left the boards completely snipe-free, a few left minimal scooping that was easily removed with hand sanding. The "Dealing With Snipe" chart, *top*, shows how each machine fared, and puts the numbers into perspective based on the steps you need to take to rid your boards of it.

We also found it pays to be diligent about using the cutterhead locks on planers so equipped. When locked, those machines averaged .002" less snipe than when left unlocked. (For more ways to save your workpieces from snipe, see the "Planer Tricks & Truths" article on *page 54*.)

■ **Cut quality.** The ideal thickness planer leaves your workpiece with a silky-smooth surface that requires little sanding before finishing. Here again, no planer is perfect, but a couple were close.

The grades for Cut Quality in the chart on *page 73* are based on three tests. In the first test, we planed 1/16" from 7"-wide red oak boards, then rubbed the surface with colored chalk to highlight any irregularities in the surface. (**Photos A** and **B** show two examples.)

Blue chalk on these planed but unsanded boards shows where the Ryobi AP1300 cut inconsistently, leaving deep and wide cuts (indicated by an absence of chalk) between the high points (left photo). On the other hand, the board planed by the Delta 22-580 (right photo) shows few gaps in the chalked area, meaning a consistently smooth cut.

C

D

E

Three distinctly different ways to gauge the depth of your cut

Tired of the typical trial-and-error method of setting cutterhead height for the first cut? Five of the tested models help you home in on the cutting depth before you even power up the planer.

The Delta 22-580 has a "blade zero" gauge (**Photo C**): Press the spring-loaded gauge down until it locks, then slide your board under the gauge and slowly crank down the cutterhead. When the gauge snaps upward, the cutterhead height is set to the same thickness as your board.

Makita's gauge is a simple floating pin (**Photo D**): Place the board under the pin, and lower the cutterhead until the pin rises. The amount of rise is the amount of material you'll remove with the cutterhead at that height.

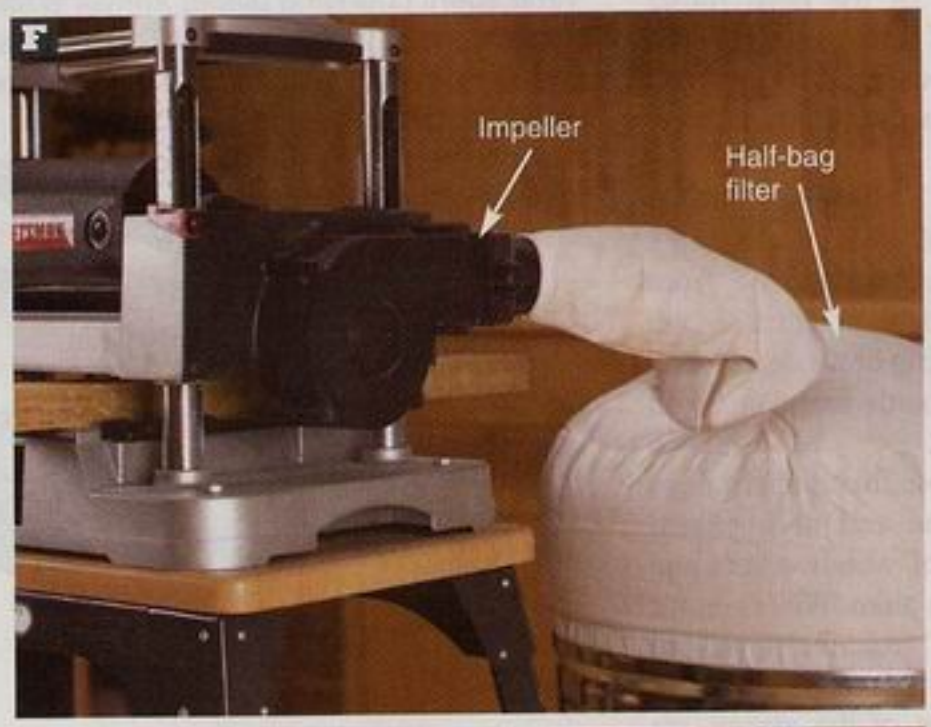
The Craftsman 21743, Ridgid TP1300LS (**Photo E**), and Ryobi AP1300 have scales that show the precise amount you'll remove in fractions of an inch. All proved accurate in our tests.

Next, to see how easily these ripples could be removed, we sanded a portion of each board with ten passes using a random-orbit sander and 150-grit paper, and chalked the sanded area. The Craftsman 21722, Delta 22-580, and Makita 2012NB earned high marks in both tests.

Finally, we wondered how well each machine would handle highly figured wood. So, even though it nearly brought our tester to tears, we made him reduce a beautiful piece of curly maple to chips, removing a scant 1/128" with each planer, and examining each cut for tear-out. Two machines—the Delta 22-580 and Jet JWP-12DX—scored high in this test with little or no evidence of tear-out.

■ **Knife-changing ease.** Double-edged disposable knives, once the exception on portable thickness planers, have almost become the rule; and that's a trend we can all get behind. Such knives self-align to the cutterhead for goof-proof knife changes. And, if you should ever nick them, the knives will move laterally on the cutterhead to prevent ridges on planed pieces. Only Grizzly and Jet still use resharpenable knives and a gauge for setting them.

We timed how long it takes to change blades on each planer, and the results are shown in the "Clocking Knife Changes" chart, on the *previous page*. Two surprises showed up here: First, tight quarters inside both Craftsman planers cost us nearly double the time required to change other disposable knives. And, in spite of having to use a knife-setting gauge, we found changing knives on the Jet JWP-12DX as fast as on most of the planers with self-aligning knives.



F

On both Craftsman planers, an impeller driven by the tool's motor whisks planer debris off to a 30-gallon garbage can. You also can attach the half-bag filter to a plastic garbage bag for carry-to-the-curb cleanup.

G

Ryobi's and Ridgid's dust hoods accommodate both 2½" and 4" hoses. As shown on the Ridgid here, you merely cap the end that is not used.

■ **Dust collection.** We don't recommend using a portable planer without using a shop vacuum, dust collector, or some other means to draw debris from the machine. Yet, it's here where these machines differed most, from Craftsman's nifty and surprisingly effective built-in dust collector (**Photo F**), to the Grizzly G8794, for which the manufacturer doesn't sell an accessory dust-collection hood. The Ridgid (**Photo G**) and Ryobi dust hoods come as standard equipment, and both will fit a 2½" vacuum hose or a 4" dust-collection hose. Optional dust hoods add $15–$40 to the cost of other planers.

Portable planers, point by point

Craftsman 21722, $300 www.sears.com/craftsman, or visit your local Sears store

High points

- Built-in dust-collection system works well with garbage can or trash bags.
- Cut quality is among the best in the test, and the snipe numbers are good, too.
- Onboard storage for knife-changing tools.

Low points

- Tight quarters around the cutterhead slowed knife changing, in spite of self-indexing knives.
- We could remove only 1/32" from boards wider than 5".
- Crank used to raise and lower cutterhead is stiff in both directions.

More points

- This bare-bones planer lacks extension tables and a cutterhead lock, but delivered good-quality cuts, albeit in shallow passes.

Craftsman 21743, $440

High points

- Built-in dust-collection system works well with a garbage can or trash bags.
- Power-assist feature helps make large changes in cutting depth easy. Manual cutterhead crank can be mounted on right or left side of machine.
- Extension tables fold up flat regardless of cutterhead height.
- Thickness scale is centered above cutterhead for good visibility.
- Onboard storage for knife-changing tools.

Low points

- Knife changing is slowed by confined space.
- The heaviest and loudest planer in the test (86.5 lbs. and 106 dB, respectively).

More points

- On some early models, the thickness stops couldn't be adjusted accurately from stop to stop. The problem has been resolved, but if you have such a model, call Craftsman at 800/266-9079 for a free replacement stop.
- If you don't own or intend to purchase a dust collector, we recommend this planer.

Delta 22-580, $420 www.deltamachinery.com, 800/438-2486

High points

- Dual stock-feed rates: The "dimensioning" rate is typical of other planers, but the "finishing" rate is slower (15 feet per minute) to help create a smooth finish.
- In curly maple, this planer created the least tear-out of any planer in the test, even when we doubled the cutting depth to 1/64".
- Easy-to-use thickness stop can be set anywhere along the machine's full 6½" capacity.
- Top-notch scales: A graduated ring around the cutterhead crank shows depth of cut down to 1/128"; and the thickness scale is high on the front of the machine for stoop-free reading. "Blade zero" indicator (**Photo C**) quickly helps set cutterhead to thickness of workpiece.

Low points

- Dust-collection hood is a $25 accessory.
- At 86 lbs., it's only a half-pound lighter than the heaviest planer in our test, the Craftsman 21743.

More points

- This machine has everything we expect in a portable planer (except a moderate price tag), and earns Top Tool honors.

Delta TP400LS, $320

High points

- Universal leg stand and extra set of knives are included in the price of the planer.
- The long, L-shaped wrench provides good leverage for tightening and loosening screws during knife changes, and keeps hands safely away from the knives.
- Onboard storage for knife-changing tools.

Low points

- Dust-collection hood is a $15 option.

More points

- Although not one of the top performers, acceptable results and the extras make the TP400LS our Top Value.

Two new, too new and one more on the way

As if ten portable planers isn't enough to choose from, we know of at least three more that we couldn't get in time to test for this article. Shop Fox's W1675 and Grizzly's G0505 (both shown at *right*) should be out by the time you read this.

The W1675 sports double-edged self-indexing knives and a depth-of-cut gauge and comes with a dust hood for $400. Grizzly's Bill Crofutt says the G0505 is very similar to the G8794 in our test, but sells for only $195.

Shop Fox W1675

Grizzly G0505

Also, DeWalt officials were tight-lipped, but did confirm the development of a new portable planer to replace the venerable DW733. The new machine is expected to be on store shelves later this year. Look for more information on these models in an upcoming issue of *WOOD®* magazine.

Ridgid TP1300LS, $400 www.ridgidwoodworking.com, 800/474-3443

High points

- Fastest knife changes in the test, with onboard tool storage for the tools required.
- Dust hood, universal leg stand, and extra set of knives are included in its price.
- At 99dB, the motor is quiet although whinier than the Makita.
- Included dust port fits both 2½" and 4" dust-collection hoses.
- Crank, cutterhead lock, and thickness stops are all located on one side of machine for easy access.
- Depth-of-cut gauge is easy to read and accurate.
- Lifetime warranty against factory defects.

Low points

- Cut quality is about average, and tear-out was severe on our curly-maple test piece.
- Thickness scale is difficult to read.
- At 85 lbs., it's heavy.
- Best in the test for snipe in red oak, but among the worst in pine.

Ryobi AP1300, $270 www.ryobitools.com, 800/525-2579

High points

- Large cutterhead lock is right up front on the machine where it's hard to forget.
- Onboard storage for knife-changing tools.
- Included dust port fits both 2½" and 4" dust-collection hoses.
- The least expensive planer in the test.

Low points

- Despite self-aligning knives, knife changes are slowed by close quarters.
- The thickness gauge jammed repeatedly in use. Ryobi's Jeanne White told us that the gauge on our planer was incorrectly assembled at the factory and should be an isolated incident.
- Cut quality is below average, and tear-out was severe in curly maple.

Talk about these tools in our special Portable Planers forum or find specifications on other types of tools by clicking on the "Tool Comparisons" tab at www.woodmall.com.

Written by **Dave Campbell** with **John Cebuhar** Illustrations: **Tim Cahill**

PERFORMANCE GRADES FOR 10 PORTABLE PLANERS

BRAND	MODEL	MOTOR AMP RATING	CUTS PER INCH (1)	MATERIAL FEED RATE (FPM)(1)	CAPACITY: WIDTH (INCHES)	CAPACITY: WORKPIECE THICKNESS (INCHES) MINIMUM	CAPACITY: WORKPIECE THICKNESS (INCHES) MAXIMUM	CAPACITY: MAX. DEPTH OF CUT (INCHES) (2) 5"-WIDE BOARD	CAPACITY: MAX. DEPTH OF CUT (INCHES) (2) 12"-WIDE BOARD	CONSTRUCTION: TABLE LENGTH WITH EXTENSIONS (INCHES)	CONSTRUCTION: BLADE STYLE (3)	CONSTRUCTION: CUTTERHEAD LOCK (Yes/No)	PERFORMANCE GRADES (4): CUT QUALITY	LACK OF SNIPE	KNIFE-CHANGING EASE	EASE OF RAISING/LOWERING CUTTERHEAD	SCALE READABILITY	CUTTERHEAD PARALLELISM	EXTENSION TABLE ALIGNMENT	THICKNESS STOP ACCURACY/EASE OF USE (5)	DEPTH-OF-CUT GAUGE ACCURACY/EASE OF USE (5)	NOISE LEVEL (dB) (6)	ACCESSORIES (7): STANDARD	ACCESSORIES (7): OPTIONAL	CORD LENGTH (FEET)	WARRANTY (YEARS) (8)	COUNTRY OF ASSEMBLY (9)	WEIGHT (POUNDS)	SELLING PRICE (10)
CRAFTSMAN	21722	12	78	24	12	7/64	4½	5/64*	1/32	12¾	2D	N	A-	B	D	D	B-	A-	N/A	N/A	N/A	102	D	S	6½	1	T	68	$300
	21743	15	56	24	13	7/64	6	1/8	5/64	34	2D	Y	B-	B	D	A	A-	A-	A	A*	A	106	D	S	6½	1	T	86.5	440
DELTA	22-580	15	60/90*	25/15*	13	7/64	6½	1/8**	3/32**	35½	2D	Y	A	A	A-	A-	A-	A	A	A	A	101		D, S	7½	2	T	86	420
	TP400LS	15	51	26	12½	7/64	6	1/8	1/8	28 9/16	2D	Y	C	B	B	A-	A-	A	A	N/A	N/A	100	K, S	D	6	2	T	68	320
GRIZZLY	G1017	16	55	26	12	7/64	6	5/32	5/32	20	1R	N	C+	D	D	C	C	A	B	N/A	N/A	102	S	D	4½	1	T	78	370
	G8794	15	57	25	12½	3/32	6	3/32	3/32	24½	2R	N	D+	D	C	D	C	D	A	N/A	N/A	102	S		6	1	T	78	300
JET	JWP-12DX	15	51	26	12½	¼	6	3/32	3/32	35	2R	Y	B+	C	A-	B	C	A-	B	N/A	N/A	103		D, K, S	5½	2	T	61	350
MAKITA	2012NB	15	51	28	12	7/64	5 7/8	1/8	3/32	30¼	2D	Y	A-	B	A-	A-	B-	A-	A	A	C	99		D, S	7½	1	C	65	480
RIDGID	TP1300LS	15	61	26	13	9/64	6	1/8	3/32	33¾	2D	Y	C+	B	A	B	C	A-	A	A	A	99	D, K, S		10	LIFE	T	85	400
RYOBI	AP1300	15	66	25	13	3/32	6	3/32	3/32	33	2D	Y	C-	D	C	B	A	A	A	A	D	104	D		7½	2	T	71.5	270

NOTES:

1. (*) "Dimensioning" mode / "finishing" mode
2. (*) Boards must be fed against one edge of table to achieve this depth.
   (**) Tested in "dimensioning" mode
3. (1R) Single-edge resharpenable
   (2D) Double-edge disposable
   (2R) Double-edge resharpenable
4. A Excellent
   B Good
   C Average
   D Below average
   N/A Model does not have this feature
5. (*) See note under "More points" for this model on *page XX*.
6. Measured 12" above table and 24" in front of planer running under no load.
7. (D) Dust-collection hood
   (K) Extra knives
   (S) Stand
8. (LIFE) Lifetime warranty against factory defects.
9. (C) China
   (T) Taiwan
10. Prices current at time of article's production and do not include shipping, where applicable.

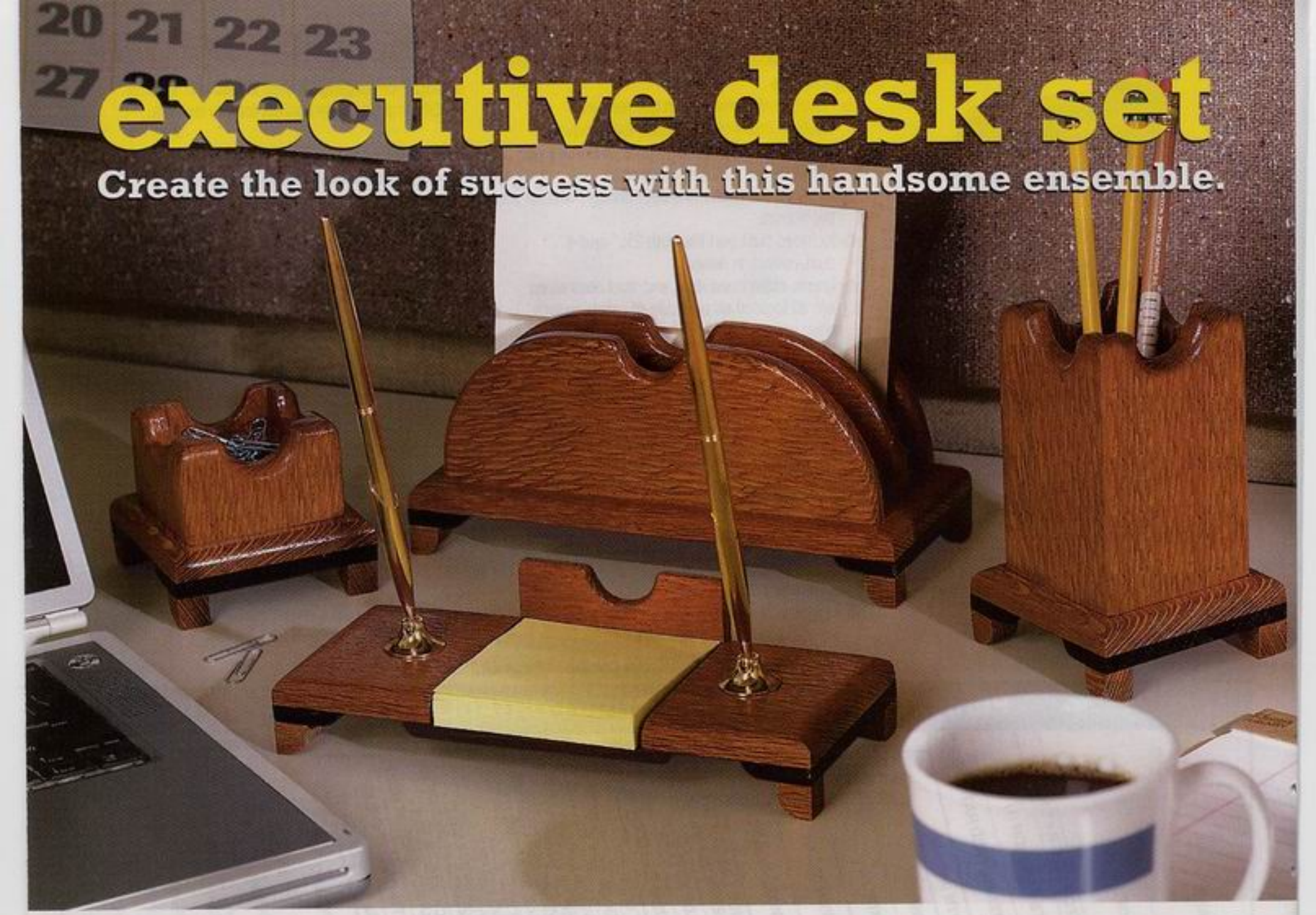
Our pick of the planers

The Delta 22-580 earns our Top Tool award for this test with excellent performance grades across the board. If you don't own a dust collector, opt instead for the Craftsman 21743. Although it fell a little short of the Delta and Makita 2012NB in some key performance areas, we think the built-in dust-collection system is a worthwhile trade-off.

If you don't feel like you can swing the $420 or more for one of those models, the Delta TP400LS is our Top Value. You'll have to work a little harder to get a finish-ready surface, but the $320 price tag includes an extra set of knives and a leg stand—accessories that would set you back about $100 if they were purchased separately.

executive desk set

Create the look of success with this handsome ensemble.



Made of exotic hardwoods, as shown *above*, or contrasting domestic woods from your scrap bin, this hardworking set tops off any desk with style. For ease of construction, many of the parts share the same dimensions and machining operations. To ensure your safety, we combined small parts on oversize blanks when cutting and shaping them.

Make the platform parts

1 For the foot rails (A) and subbases (B), resaw in half a ¾×3⅜×12" piece of wenge. Plane the halves to ¼" thick.

2 Aligning your router-table fence flush with the bit's pilot bearing, rout ¼" round-overs on both ends of both blanks. Use a follower block to keep the blanks perpendicular to the fence and prevent chip-out. Sand the end 2" of the blanks and their round-overs to 220 grit.

3 Crosscut 1" off the ends of each blank to make four foot rails (A). Repeat the routing and sanding, and cut four more parts A for a total of eight parts.

4 To make the two subbases (B), crosscut the remaining portions of the blanks to 4" long, and rout ¼" round-overs on their ends. Sand to 220 grit, and set parts A and B aside.

5 For the envelope holder base (C), pencil and paper clip cup bases (D), and writing set bases (E), resaw and plane a ¾×3⅜×21" piece of lacewood to ⅜" thick. From this blank, crosscut one piece 8" long for part C, two pieces 3⅜" long for parts D, and two pieces 2⁷⁄₁₆" long for parts E.

6 In the same manner as before, rout ¼" round-overs on the top ends, then edges of parts C and D. Then rout one top end and both top edges of the parts E.

7 Drill holes in the writing set bases (E), where shown on **Drawing 1**. Sand parts C, D, and E to 220 grit.

8 Rip and plane a ½×½×12" lacewood blank for the feet (F). Positioning the fence and using a follower block as before, rout ⅜" round-overs on both ends of the blank. Finish-sand the round-overs and sides of the blank.

9 Cut a ½"-long foot (F) from each end of the blank. Rout two more round-overs, sand the blank, and cut two more feet. Repeat until you have 16 feet. For a safe way to cut these small parts, see the **Shop Tip**, *opposite*.

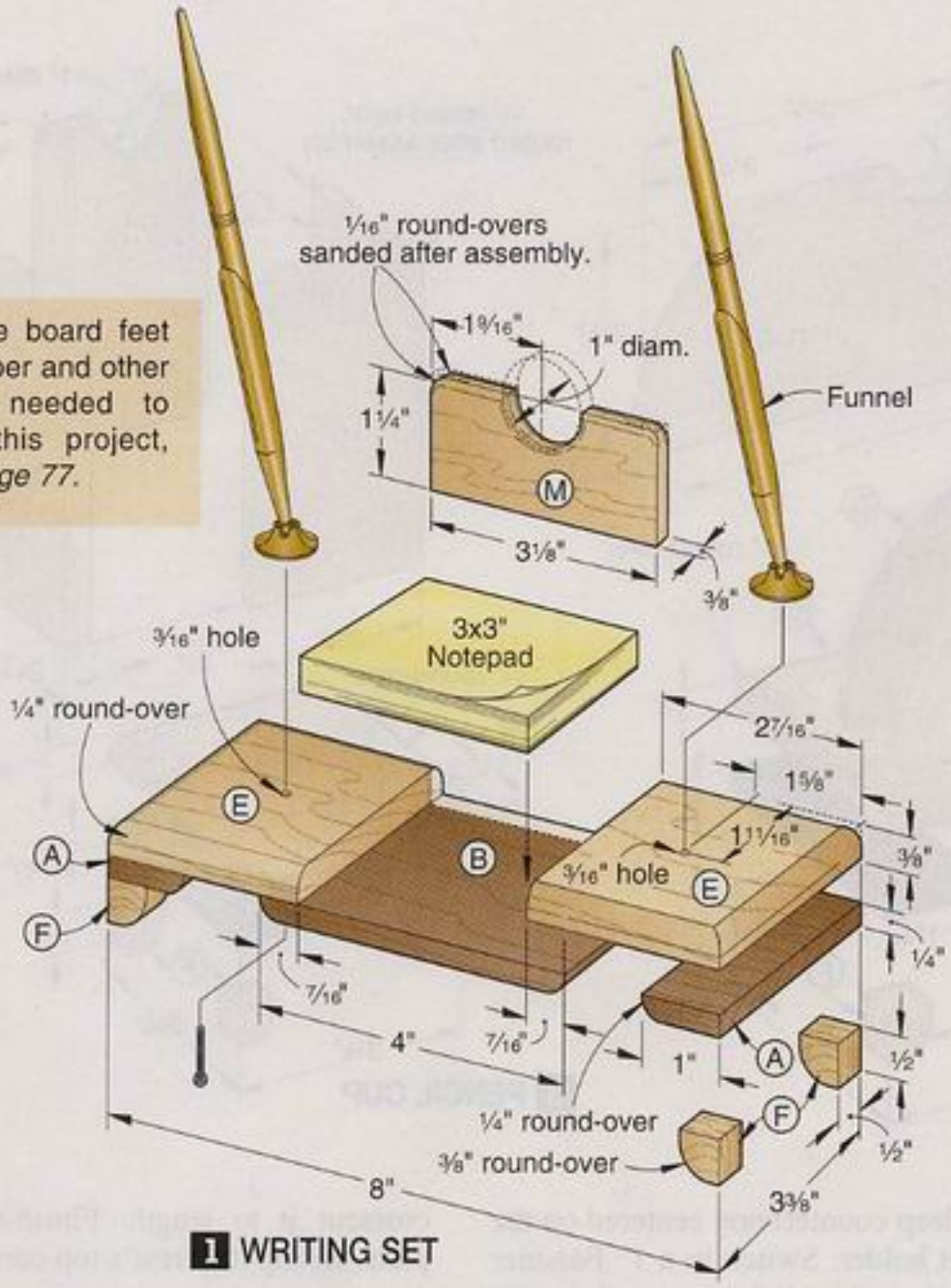
Assemble the platforms

1 Glue and clamp the foot rails (A) to the envelope holder base (C), where shown on **Drawing 2**; the pencil and paper clip cup bases (D), where shown on **Drawings 3** and **4**; and the writing set bases (E), where shown on **Drawing 1**.

2 Cut a ¾×3⅛×3⅜" scrap spacer, and clamp it, centered end to end, to one subbase (B). Apply glue to the subbase's exposed ends, and clamp the two assemblies A/E in place, where shown on **Drawing 1**. Remove the spacer, and wipe away any excess glue. Glue the other subbase, centered end to end, to the envelope holder base (C), where shown on **Drawing 2**.

3 With the glue on the platform assemblies dry, glue and clamp the feet (F)

For the board feet of lumber and other items needed to build this project, see *page 77*.



1 WRITING SET

to the platforms, where shown on **Drawings 1, 2, 3,** and **4**. With the glue dry, finish-sand the assemblies.

Make the dividers

1 Resaw and plane a lacewood blank to 3/8×3 1/8×24" for the dividers (G). Referring to the **Cutting Diagram**, lay out the parts to the dimensions shown on **Drawing 2**.

2 Chuck a 1" Forstner bit in your drill press, and drill the holes.

3 Rip the blank to 2½" wide, cutting to the left of the centers of the holes, and forming the semicircles. Bandsaw and sand the 2½" radii.

Guided by the drill-press fence and a stopblock, bore 1" holes in the blanks for parts H and I, and J and K.

4 Rout 1/8" round-overs on the edges of the dividers where shown. Finish-sand the parts.

Make the cups and crest

1 Resaw and plane two lacewood blanks to 3/8×2 5/8×7½" for the pencil and paper clip cup fronts and backs (H, I). Resaw and plane two more lacewood blanks to 3/8×2 1/4×7½" for the pencil and paper clip cup sides (J, K). Referring to the **Cutting Diagram**, mark lines across each blank 3/4" from their ends, and then mark the midpoints of these lines. For the parts' finished lengths, mark lines across each blank 2¼" from one end and 4¾" from the other end.

2 With the 1" Forstner bit in your drill press, bore holes at the marked midpoints on the blanks for parts H and I, as shown in **Photo A**. Readjust your setup, and bore the holes in parts J and K.

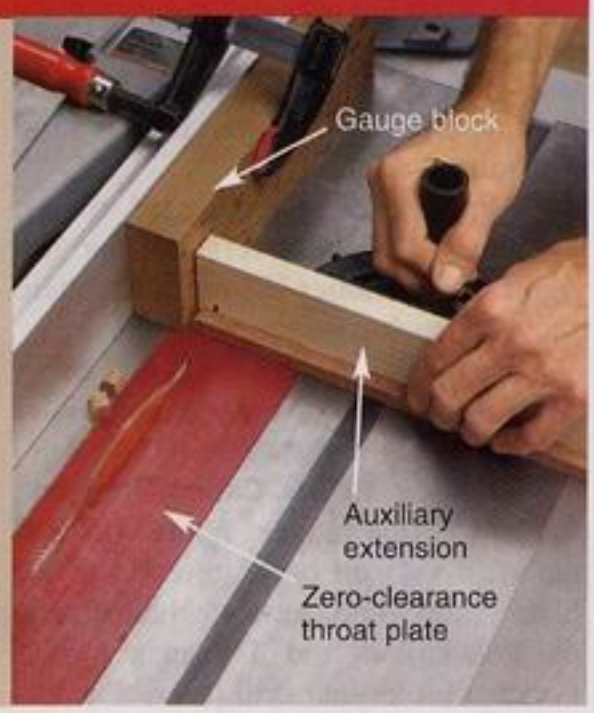
SHOP TIP

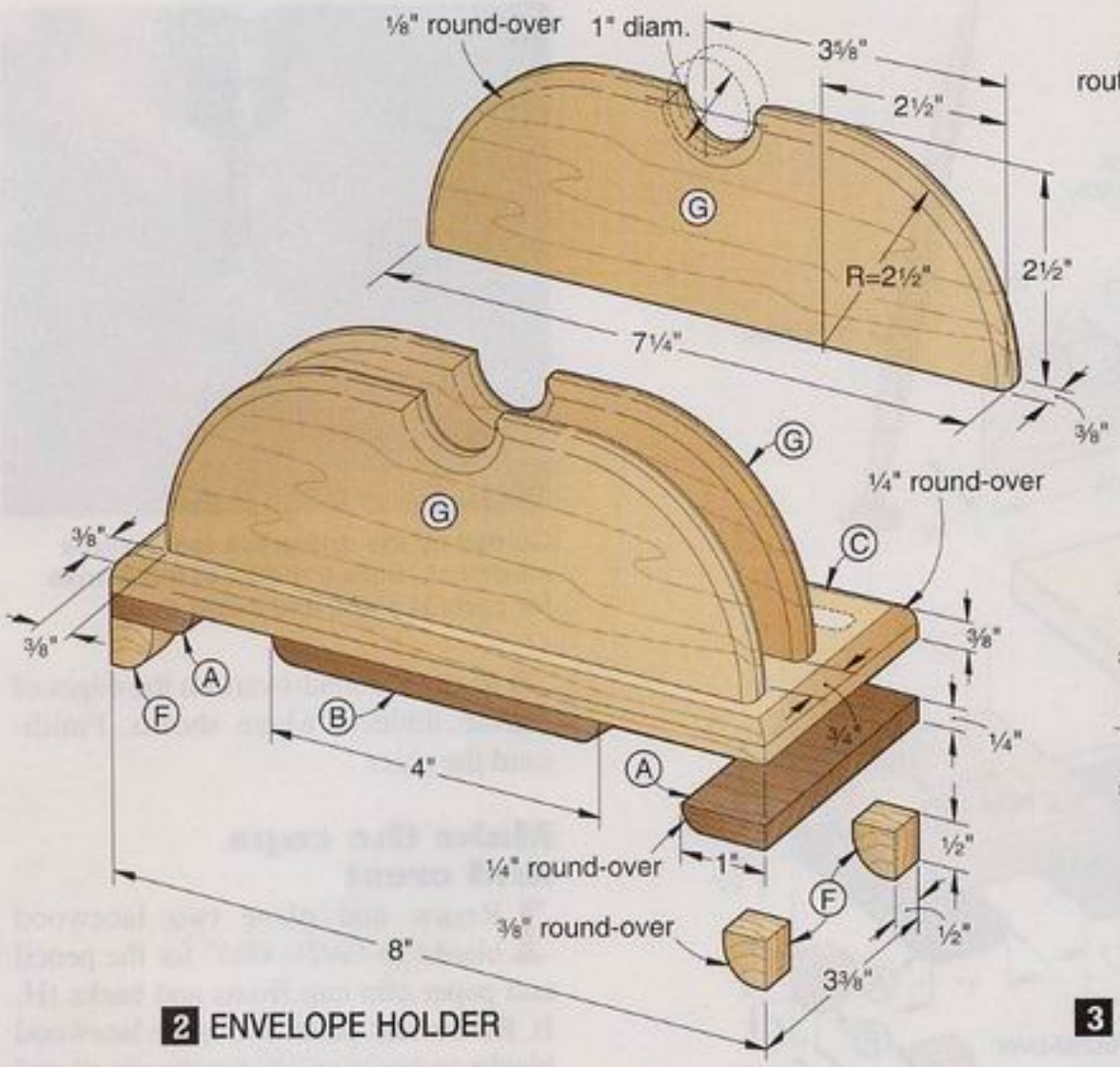
Cut multiple small parts safely and accurately

How can you make tiny parts, such as the 16 feet (F) needed for this project, keep your fingers clear of the blade, and avoid having the part kick back, while maintaining repeatable accuracy? The photo, *right*, shows how.

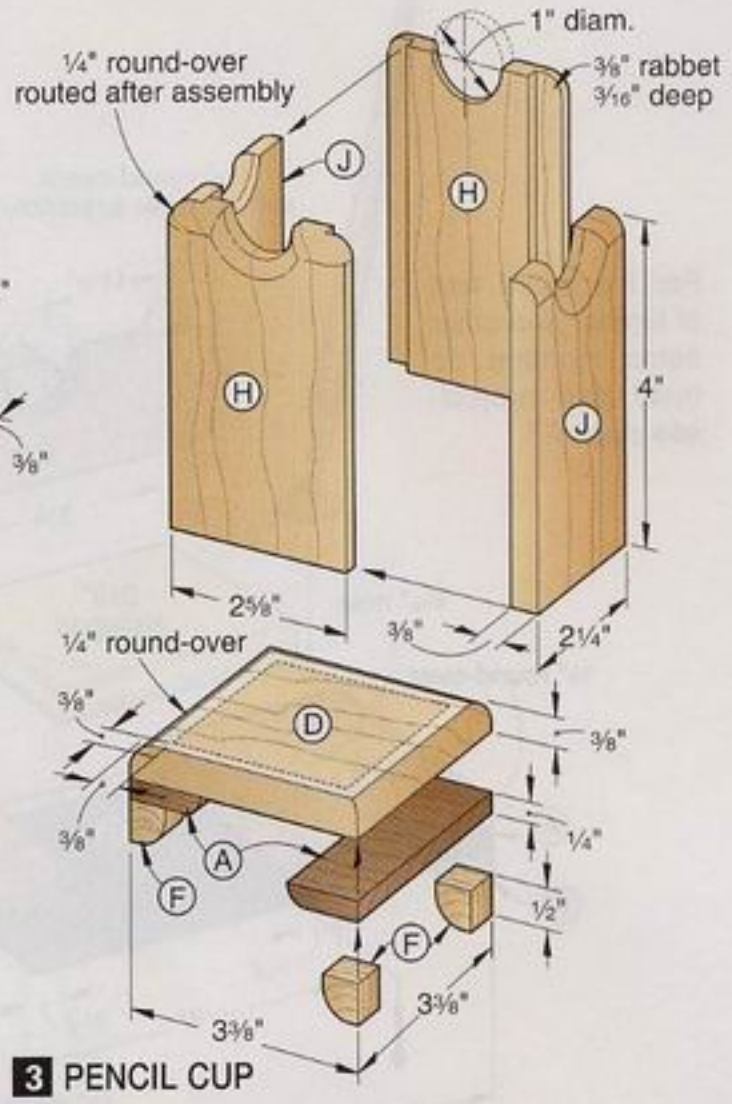
First, install a zero-clearance throat plate in your tablesaw. (For information on making such a plate, see "10 ways to tablesaw success" in issue 141, or go to www.woodonline.com and type "zero-clearance" in the site-search window.) Then, clamp a 1½"-thick gauge block to your rip fence, positioning its end about 1" in *front* of the blade. Adjust the fence so the distance from the blade's right edge to the block's face is the length of the part you wish to cut. Attach an auxiliary extension to the miter gauge so its end just clears the gauge block's face.

Position the workpiece against the auxiliary extension, touching the gauge block. Holding the workpiece firmly, slide the miter gauge forward, making the cut. The end of the workpiece clears the gauge block before the cut is made, so the small part is free to move away from the blade.





2 ENVELOPE HOLDER



3 PENCIL CUP

3 Aligning your router-table fence flush with the bit's pilot bearing, rout rabbets along the edges of the blanks for parts H and I, where shown on **Drawings 3** and **4**.

4 Trim off the ends of the blanks for parts H, I, J, and K, as shown in **Photo B**. Then cut the pencil cup and paper clip holder backs, fronts, and sides to their marked finished lengths.

5 Apply glue to the rabbets, and clamp the fronts, backs, and sides together, where shown on **Drawings 3** and **4**. Keep the tops of the assemblies even. With the glue dry, sand the sides flush. Tape a sheet of 120-grit sandpaper to a flat surface, and sand the bottoms flat.

6 Using your table-mounted router, rout ¼" round-overs on the top edges of assemblies H/J and I/K, where shown. Finish-sand the assemblies.

7 Resaw and plane a lacewood blank to ⅜×2×12" for the magnet holder (L), crest (M), and spacers (N).

8 Referring to the **Cutting Diagram**, lay out the magnet holder (L) and the crest (M) on opposite ends of the blank. Mark hole centers, where shown on **Drawings 1** and **4**. Chuck a 1⅛" Forstner bit in your drill press, and drill a ⅛"-deep counterbore, centered on the magnet holder. Switch to a 1" Forstner bit, and drill a hole centered in the counterbore, and then drill a hole at the marked centerpoint on the crest.

9 Rip the blank to 1⅞" wide, the width of the magnet holder (L), and then crosscut the magnet holder from the blank's end. Crosscut two ½"-long pieces from the blank for the spacers (N). Rip the crest (M) to width, cutting through the 1"-diameter hole, and then crosscut it to length. Finish-sand the parts, easing the crest's top corners.

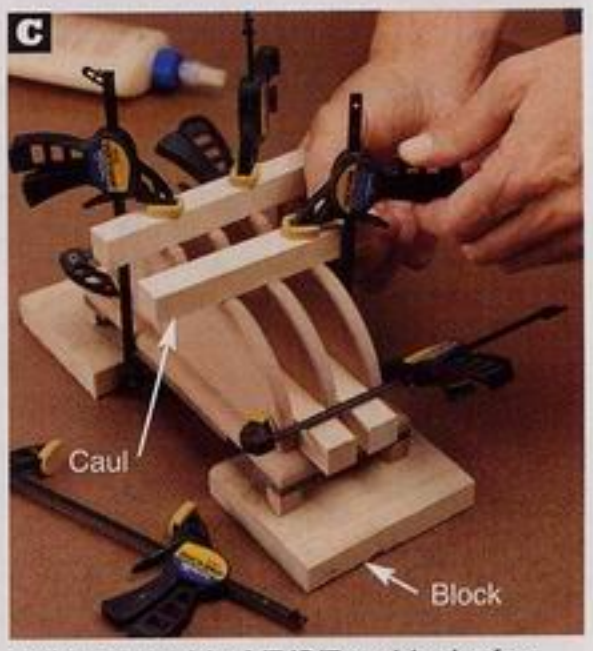
Add dividers, cups, and crest to the platforms

1 Apply glue to the crest's bottom edge, and clamp it to part B, where shown on **Drawing 1**.

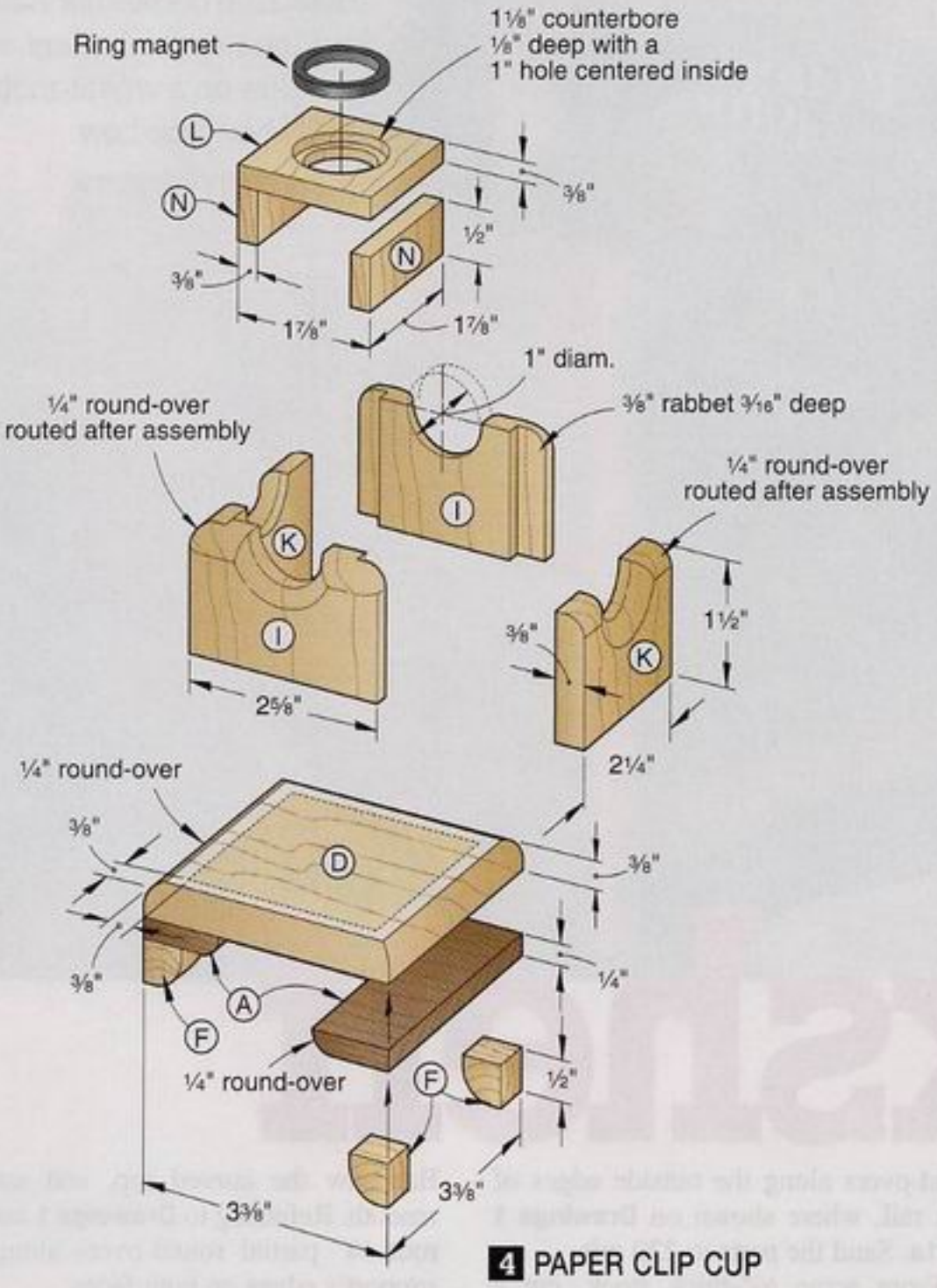
2 To position the dividers (G) on part C, first cut two ¾×¾×9" scrapwood spacers. Clamp the dividers together, separated by the spacers. Make sure the

B

Form the semicircles by cutting through the 1" holes at the ends of the blanks for parts H and I, and J and K.



Raise assembly A/B/C/F on blocks for clamp clearance. Use scrapwood cauls to apply firm, even pressure to the dividers.



4 PAPER CLIP CUP

bottoms and ends of the dividers are flush and that the spacers are about ⅛" up from the dividers' bottom edges. Apply glue to the dividers, and clamp them to part C, where shown on **Drawing 2** and as shown in **Photo C**. With the dividers clamped to the platform, remove the spacers.

3 Apply glue to the bottom edges of the pencil and paper clip cups, and clamp them, centered, to their bases. With the glue on the paper clip cup dry, glue parts N to the inside faces of parts K and part L to the top ends of parts N.

Finishing up

1 Sand 1/16" round-overs on the edges of the writing set crest (M). Inspect all the components, and resand any areas that need it to 220 grit.

2 To give the set a gleaming "desk jewelry" look, spray on three coats of aerosol gloss polyurethane, sanding with 220-grit sandpaper between coats.

3 With the finish dry, fasten the pen and pencil funnels to the writing set platform with the machine screws provided. Remove the backing sheet from a 3×3" Post-it notepad, and stick the pad in place. Apply quick-set epoxy to the magnet holder's counterbore, and press the ring magnet in place.

Written by **Jan Svec** with **Jeff Mertz**
Project design: **Kevin Boyle**

materials list

Part	FINISHED SIZE T	W	L	Matl.	Qty.
A* foot rails	¼"	3⅜"	1"	W	8
B* subbases	¼"	3⅜"	4"	W	2
C* envelope holder base	⅜"	3⅜"	8"	L	1
D* pencil and paper clip cup bases	⅜"	3⅜"	3⅜"	L	2
E* writing set bases	⅜"	3⅜"	2⁷⁄₁₆"	L	2
F* feet	½"	½"	½"	L	16
G* dividers	⅜"	2½"	7¼"	L	3
H* pencil cup front and back	⅜"	2⅝"	4"	L	2
I* paper clip cup front and back	⅜"	2⅝"	1½"	L	2
J* pencil cup sides	⅜"	2¼"	4"	L	2
K* paper clip cup sides	⅜"	2¼"	1½"	L	2
L* magnet holder	⅜"	1⅞"	1⅞"	L	1
M* crest	⅜"	1¼"	3⅛"	L	1
N* spacers	⅜"	1⅞"	½"	L	2

*Parts initially cut oversize. See the instructions.

Materials key: W–wenge, L–lacewood.

Supplies: Quick-set epoxy.

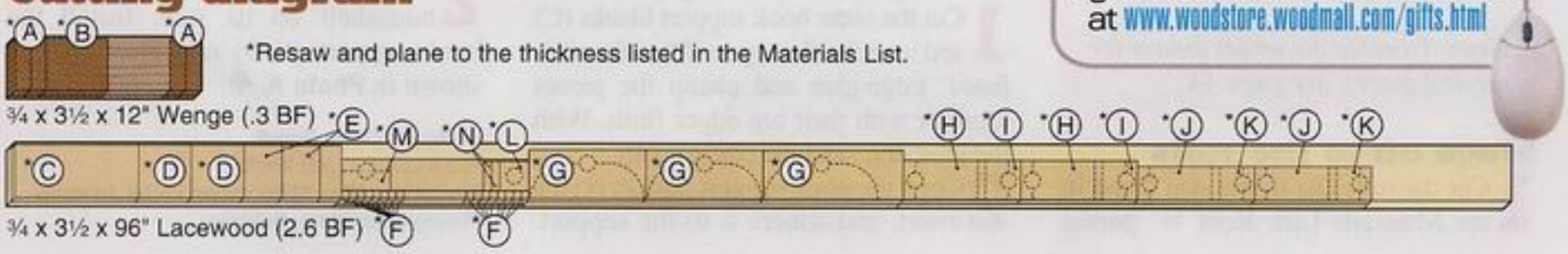
Bits: ⅛", ¼", and ⅜" round-over router bits, rabbeting router bit; 1" and 1⅛" Forstner bits.

Buying Guide

Hardware. Ballpoint pen and mechanical pencil with matching funnels and mounting screws, ring magnet. Kit no. 950-5000, $16.99 ppd. Price reflects a discount for *WOOD*® magazine readers. Craft Supplies USA. Call 800/551-8876, or go to www.woodturnerscatalog.com.

Hardware and wood. All the hardware listed above, plus wenge and lacewood stock planed to the finished thicknesses for the parts listed. Kit no. W-148, $32.95 ppd. Heritage Building Specialties, 800/524-4184.

cutting diagram


A B A
*Resaw and plane to the thickness listed in the Materials List.
¾ x 3½ x 12" Wenge (.3 BF)
E M N L
H I H I J K J K
C D D
G G G
¾ x 3½ x 96" Lacewood (2.6 BF)
F F

Find more . . .

...great decorative accessories at www.woodstore.woodmall.com/gifts.html

Add spice to your kitchen countertop with this adjustable cookbook holder. And for a special effect, scrollsaw and glue on a wheat-motif onlay. We'll show you how.

chef's bookshelf

First, make the ends

1 Edge-join ¾"-thick stock to make an 8×17" blank for the ends (A). Crosscut the blank to form two 8⅜"-long pieces.

2 Make two copies of the end pattern on the *WOOD PATTERNS®* insert. Attach one pattern to each blank with spray adhesive. Bandsaw the curved top and bottom cutout on each piece, and sand the parts smooth.

3 Referring to **Drawings 1** and **1a**, rout ⅜" partial round-overs along the edges on both faces of the end pieces.

4 Cut a ¾" dado ¼" deep on the inside face of the end pieces, where shown on the pattern and **Drawing 1**.

5 Drill two ¼" holes ¼" deep on the outside face of each end piece, where shown on the pattern. Remove the patterns, and sand the pieces to 220 grit.

***Note**: To make the wheat onlays for the end pieces, see* page 44.

Move on to the rails

1 Cut the rails (B) to the size listed in the Materials List. Rout ⅜" partial round-overs along the outside edges of each rail, where shown on **Drawings 1** and **1a**. Sand the parts to 220 grit.

2 From scrap ¾"-thick stock, cut a 1⅞×12" spacer. Center the spacer between the rails' (B) nonrouted edges, and clamp the pieces together.

3 On each end (A), mark the location in the dado for the front rail (B), where dimensioned on **Drawing 1**. Glue and clamp the ends to the rails.

4 With the glue dry, remove the clamps and spacer. Drill pilot and countersunk shank holes centered in the ¼" holes in the ends (A). Apply paraffin wax to #6×1½" flathead wood screws, and drive the screws. Plug the holes, let the glue dry, and sand the plugs flush.

Add the book support

1 Cut the outer book support blanks (C) and inner book support (D) to the sizes listed. Edge-glue and clamp the pieces together with their top edges flush. With the glue dry, sand the part smooth.

2 Copy the book support pattern on the insert, and adhere it to the support. Bandsaw the curved top, and sand it smooth. Referring to **Drawings 1** and **1b**, rout ¼" partial round-overs along the support's edges on both faces.

3 Cut the cleat (E) to size. Sand it smooth. Place the book support (C/D) facedown on a scrap piece of ¼" hardboard. (This centers the support on the cleat's width.) Now, center the cleat end to end on the support's bottom, and clamp the pieces together. Drill pilot and countersunk shank holes through the cleat's bottom, where dimensioned on **Drawing 1**. Do not drive the screws yet.

Finish up

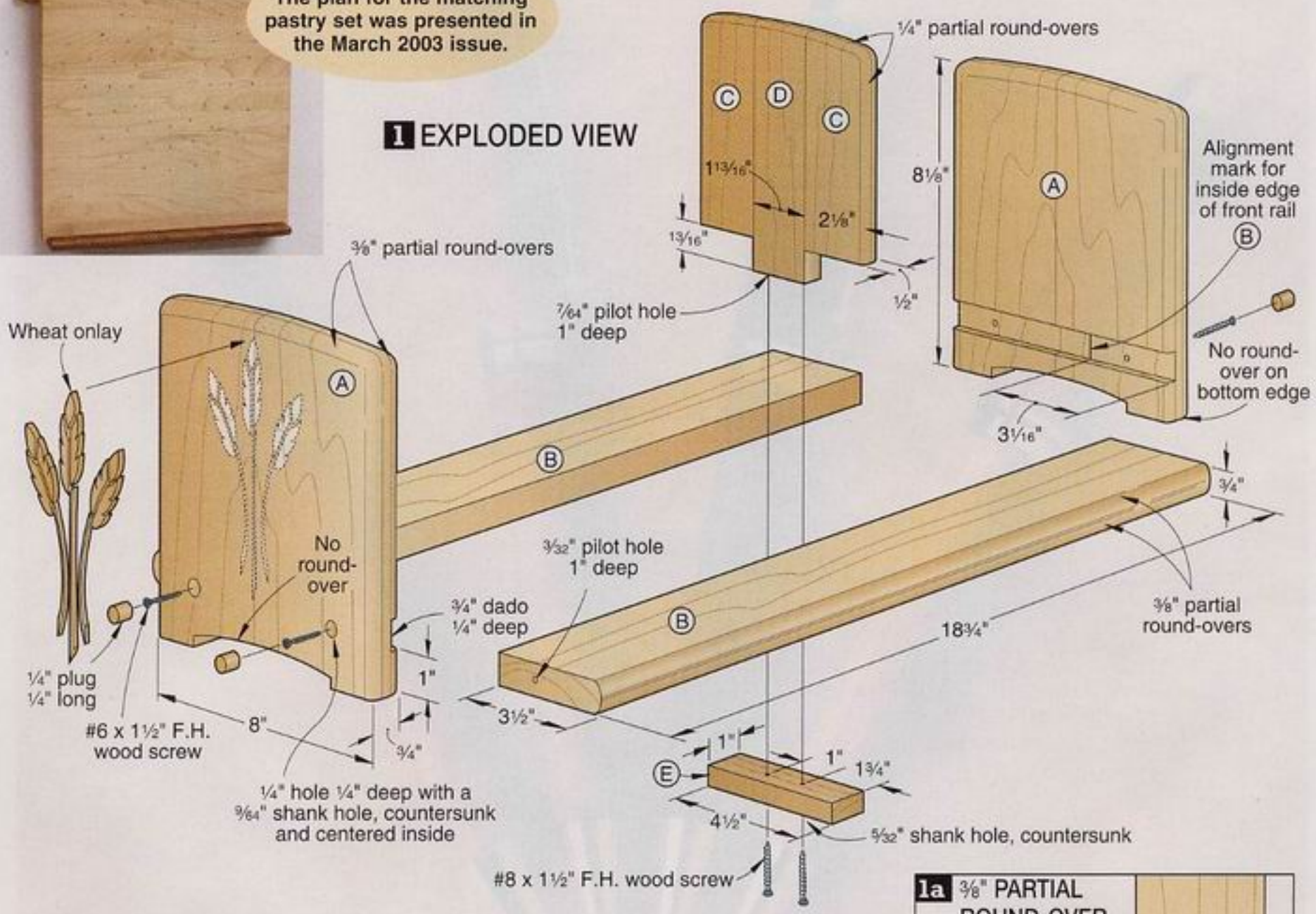
1 Resand any areas that need it. Apply three coats of satin polyurethane, sanding to 220 grit between coats.

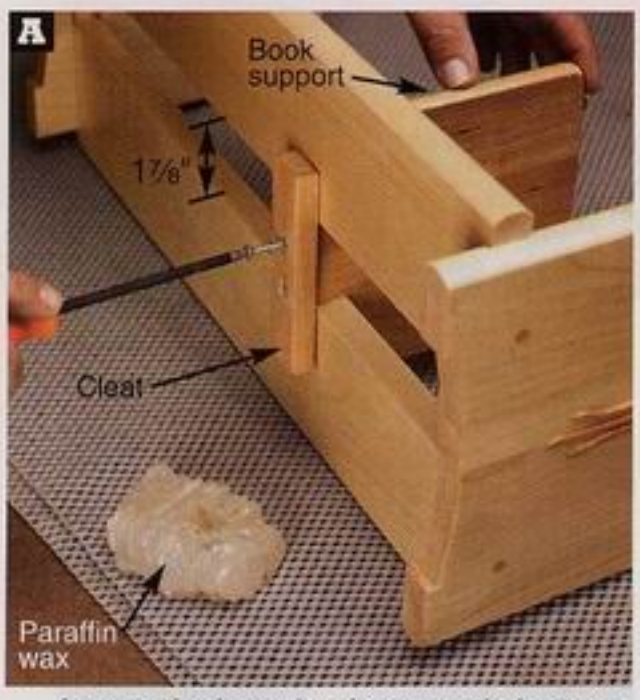
2 When the finish dries, place the bookshelf on its side. Install the book support (C/D) and cleat (E), as shown in **Photo A**.

Written by **Owen Duvall**
Project design: **Jeff Mertz**
Illustrations: **Mike Mittermeier; Lorna Johnson**
Photographs: **Marty Baldwin**

The plan for the matching pastry set was presented in the March 2003 issue.

1 EXPLODED VIEW





Locate the inner book support's bottom between the rails. Attach the cleat with screws lubricated with paraffin wax.

materials list

Part	FINISHED SIZE T	W	L	Matl.	Qty.
A* ends	¾"	8"	8⅛"	EM	2
B rails	¾"	3½"	18¾"	M	2
C outer book support blanks	½"	2⅛"	5⅜"	C	2
D inner book support	½"	1 13/16"	6 3/16"	C	1
E cleat	½"	1"	4½"	C	1

*Parts initially cut oversize. See the instructions.

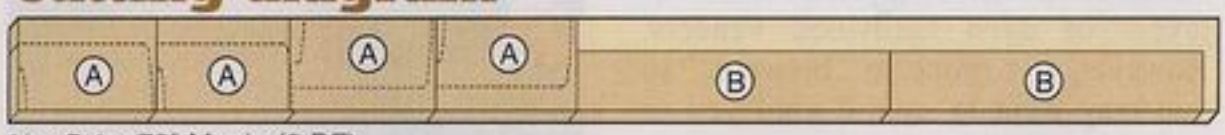
Materials key: EM–edge-joined maple, M–maple, C–cherry.

Supplies: #6×1½" flathead wood screws (4), #8×1½" flathead wood screws (2), paraffin wax, spray adhesive.

Blades and bits: ¼" and ⅜" round-over router bits, dado-blade set.

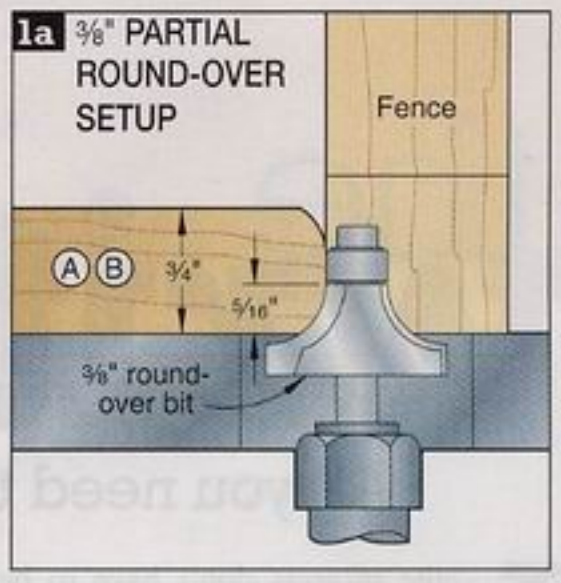
½ x 3½ x 24" Cherry (.7 BF)

cutting diagram

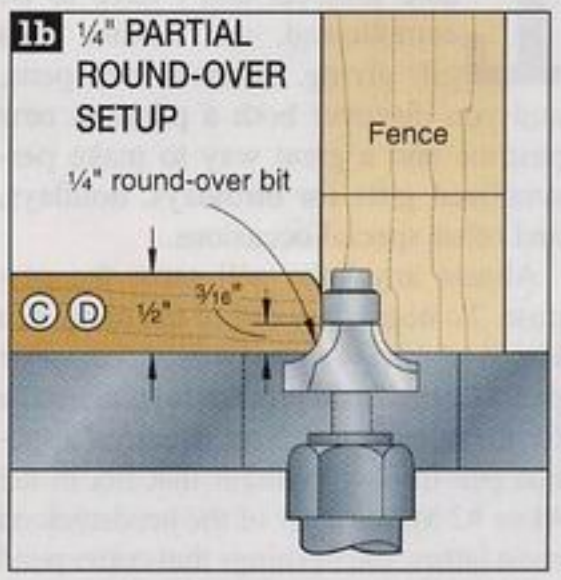


¾ x 5½ x 72" Maple (3 BF)

1a ⅜" PARTIAL ROUND-OVER SETUP



1b ¼" PARTIAL ROUND-OVER SETUP



the write stuff

All you need to master pen turning

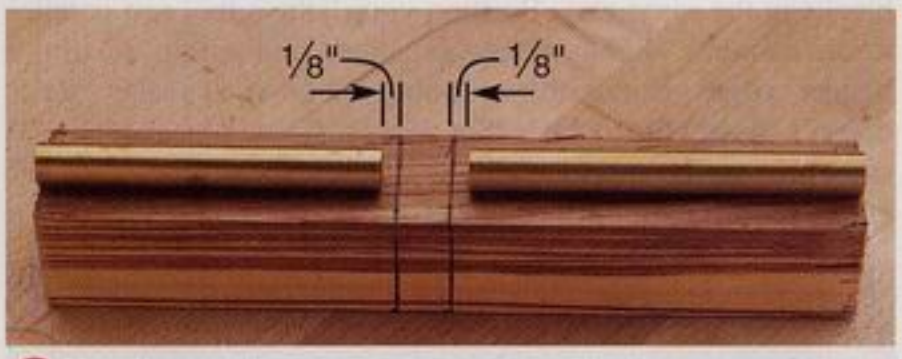
Lathe projects don't have to be complicated, and neither does gift giving. Learn to turn pens, and you discover both a pleasant new pastime and a great way to make personalized gifts for birthdays, holidays, and other special occasions.

Almost any lathe will serve the purpose. To begin, buy one of the many pen kits available. We used a European-style pen, but the basic procedure is the same for the other styles. You also need a special pen-turning mandrel that fits in the #1 or #2 Morse taper of the headstock on most lathes, the bushings that correspond with your particular pen kit, the appropriate drill bit, and a special tool called a pen mill. See the Buying Guide at the end of the article for information about ordering these products.

Use any figured scrapwood to make a ¾×¾×5" blank for the pen body. Or, buy assortments of precut blanks through mail-order catalogs. After you gain some experience, you might decide to try more-expensive man-made materials. Dymondwood, for example, makes an eye-catching pen. It's made of layers of dyed hardwood veneers. However, it's prone to "blowout," so you may want to save it until you've had some practice.

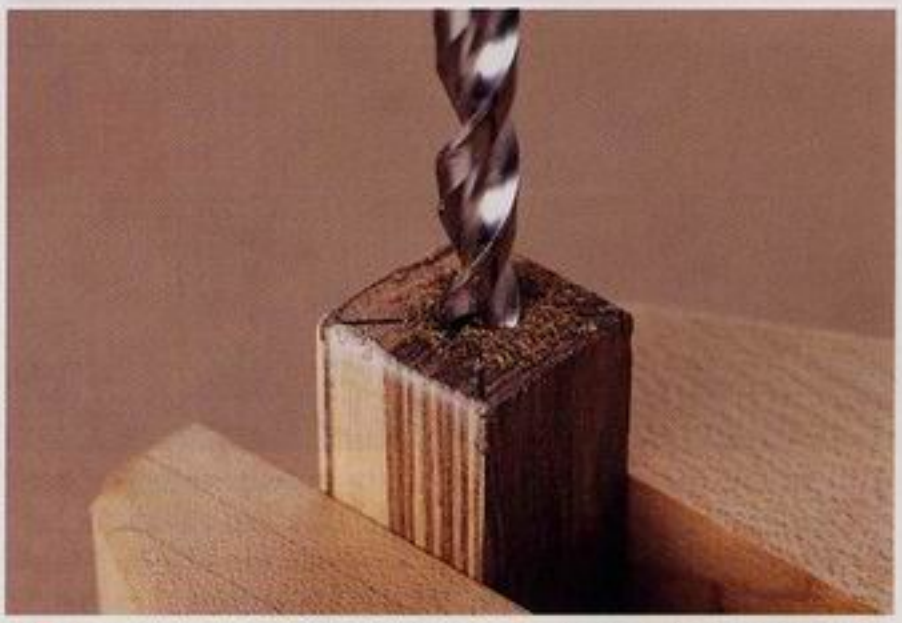
First, prepare the blanks

1 Order a pen kit (see the Buying Guide on *page 83*), and you'll receive an assortment of parts such as this. Variations include pencil mechanisms, fountain pens, and different colors of metal plating. **Drawing 1** shows you how this set goes together inside the completed pen.



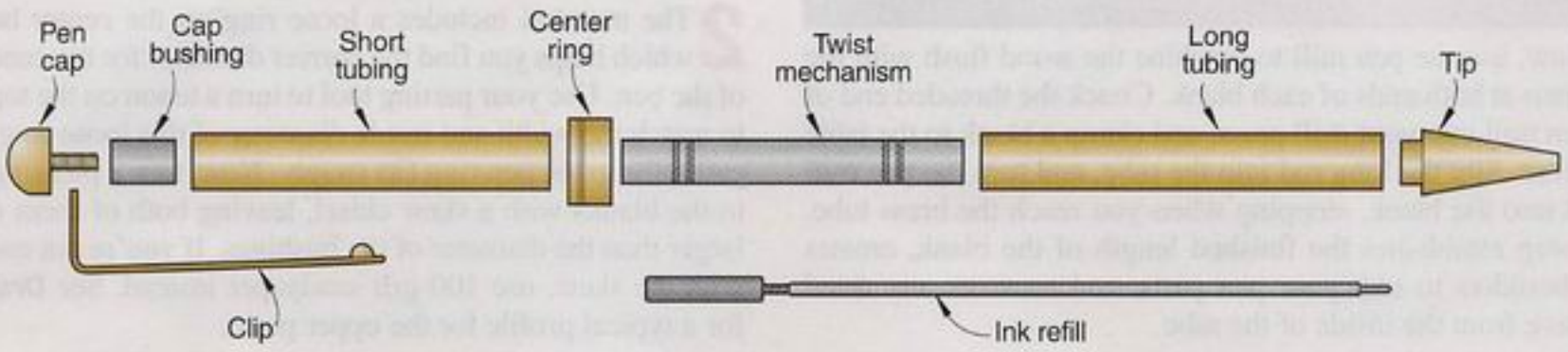
2 Use the two pieces of tubing to mark cutlines on your pen blank. Leave ⅛" extra on each piece, as shown. Cut carefully with your tablesaw or mitersaw to produce straight, square ends, and discard the waste piece. The longer blank becomes the bottom end of the pen, and the shorter one goes at the top.

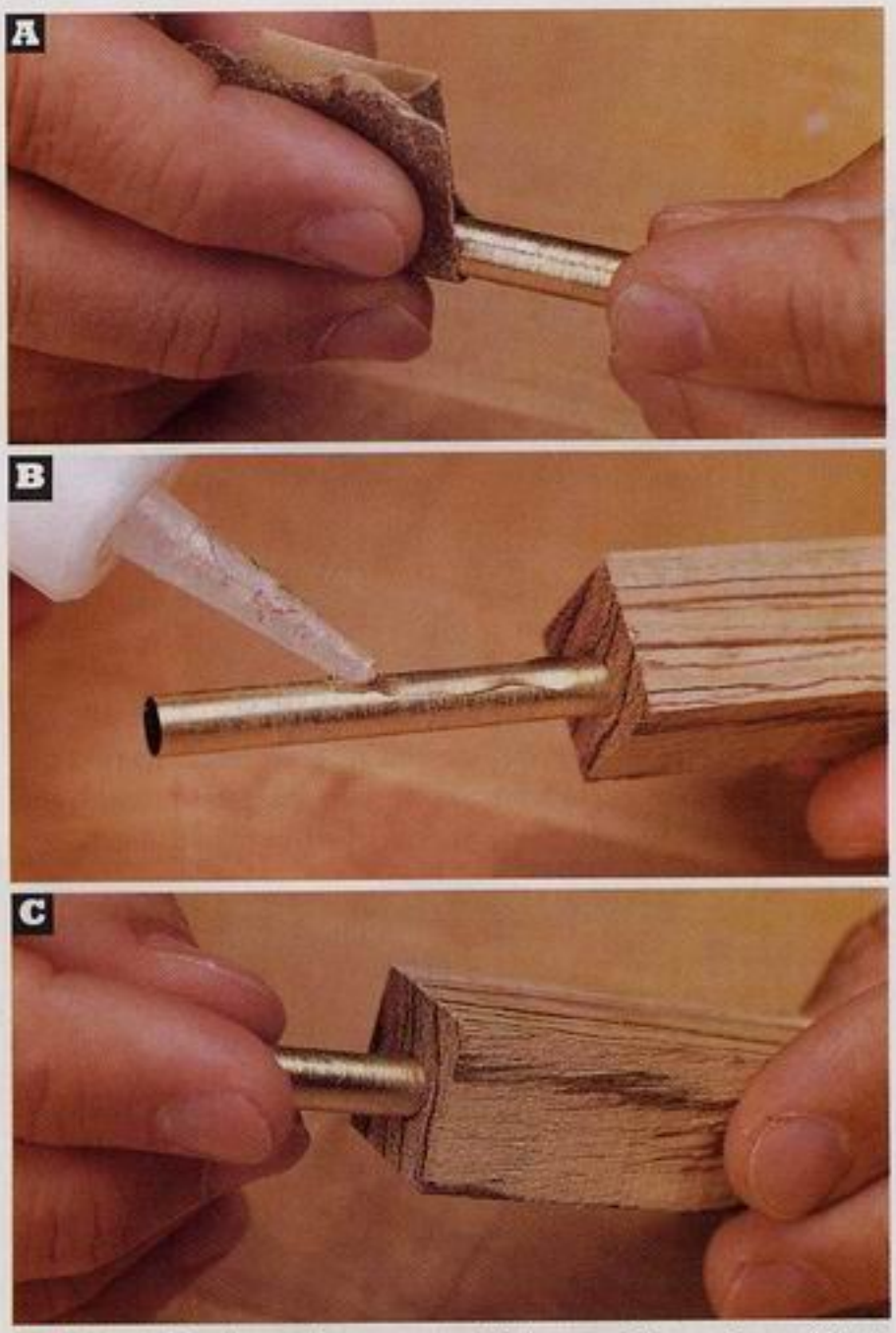
3 Draw diagonal lines on one end of each blank to find the center. Make an indentation at their intersection with the point of an awl to help guide your drill bit in the next step.



4 Clamp a piece of plywood on your drill-press table. Chuck the appropriate bit (ours was 7 mm) into your drill press, and make sure the table and bit are at right angles. Tighten one of the pen blanks vertically in a handscrew clamp, keeping the blank perpendicular to the table. Center the bit on the awl mark, and clamp the handscrew to the table. With your drill press running at 150 to 250 rpm, drill through the length of the blank. Pull the bit out occasionally as you drill to clear the shavings.

1 EUROPEAN-STYLE PEN PARTS

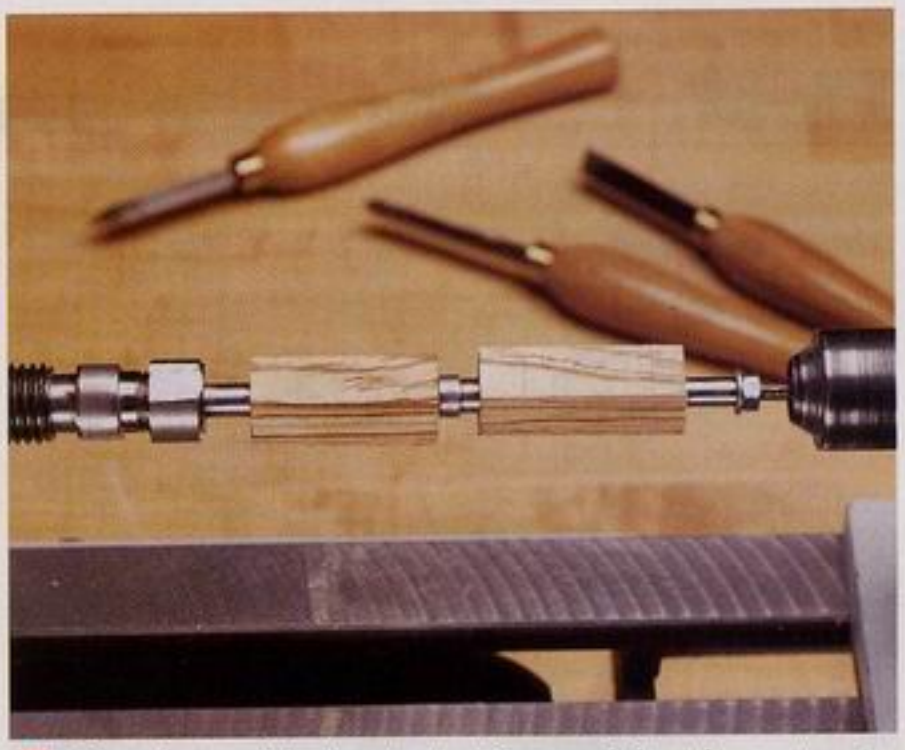




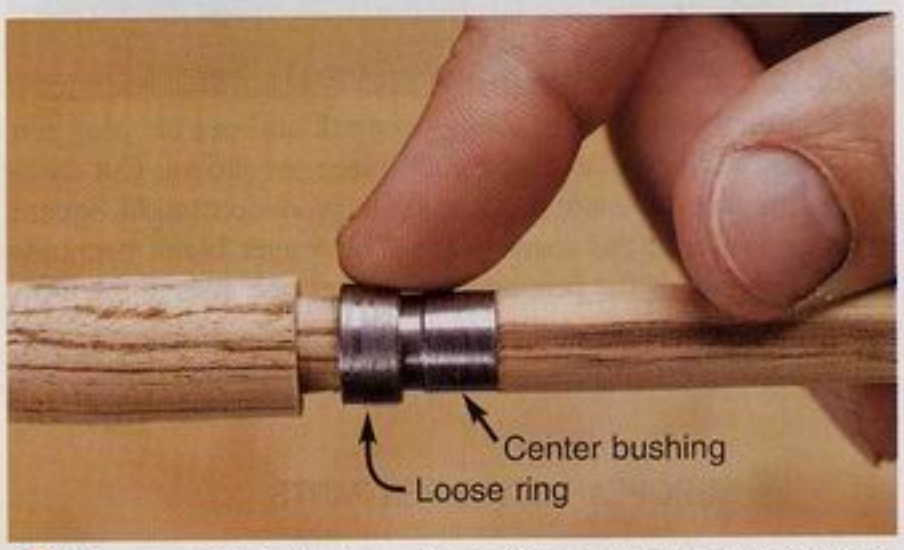
5 Use 150-grit sandpaper to scuff the outside surface of both brass tubes, as shown in **Photo A**. This step allows for better adhesion when gluing the tubes inside the blanks. Match each tube to its blank, and coat the outside surface of each tube with cyanoacrylate glue, as shown in **Photo B**. Rotate each tube as you push it into its blank, to evenly distribute the adhesive, as shown in **Photo C**. Locate the tube about 1/16" below the end of the blank at both ends.

6 Now, use the pen mill to machine the wood flush with the brass at both ends of each blank. Chuck the threaded end of the pen mill into your drill press, and clamp a blank to the table as before. Slip the long rod into the tube, and turn the pen mill to cut into the blank, stopping when you reach the brass tube. This step establishes the finished length of the blank, creates 90° shoulders to seat your pen parts, and removes any dried adhesive from the inside of the tube.

Now, turn and



1 Place the two blanks, the bushings, and the other parts onto your mandrel as shown *above* and in **Drawing 2**. Make sure to keep the blanks in their original orientation so the grain looks good in the finished pen, with the shorter one closest to the end that fits into the lathe headstock. Tighten the knurled nut just enough to keep the wood from spinning loosely on the mandrel during turning. Mount the mandrel on the lathe, sliding the Morse taper end into the headstock, and fitting the other end against a live center. We used a top-quality pen-turning mandrel here, but you'll find that less-expensive mandrels accept the blanks in the same way. Position your lathe's tool rest parallel to the mandrel, slightly below its center, and within ¼" of the blanks' edges. Rotate the assembly by hand to make sure it doesn't contact the tool rest. Set your lathe speed to about 2,000 rpm, turn on the machine, and use light cuts with a ¼" or ⅜" gouge to turn both of the blanks round.



2 The mandrel includes a loose ring on the center bushing, which helps you find the correct diameter for the center ring of the pen. Use your parting tool to turn a tenon on the top blank to match the width and inside diameter of this loose ring. Work carefully so the pen ring fits snugly. Now, turn a pleasing shape to the blanks with a skew chisel, leaving both of them slightly larger than the diameter of the bushings. If you're not confident with the skew, use 100-grit sandpaper instead. See **Drawing 3** for a typical profile for the upper piece.

finish the pen

3 Cut a strip of 150-grit sandpaper, and begin to sand the blanks smooth with the lathe running. For safety, hold the sandpaper as shown. This approach also lets you avoid the heat generated by sanding. Make sure the blanks match the bushing diameters at each contact point. Complete the smoothing process with 180- and 220-grit sandpaper.

4 Dampen a paper towel with lacquer sanding sealer. Holding the paper as shown, apply sealer to the two blanks with the lathe running. Switch the lathe off, and lightly sand the blanks with 600-grit sandpaper, working with the grain. Turn the lathe on, and hold a clean paper towel against the wood to burnish and clean it. Turn off the lathe, and apply two coats of finish, such as Mylands Friction Polish, with a clean cloth. With the lathe on, apply pressure to the wood with a cloth. The friction creates heat that sets the polish. If you prefer a higher gloss, repeat this finishing step.

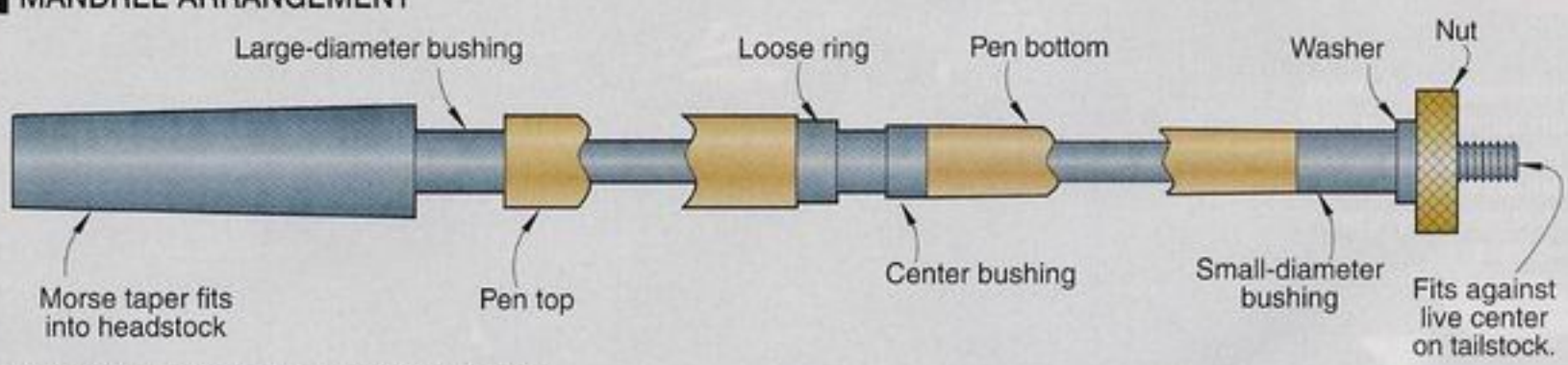
5 All that's left is to assemble the pen parts. Secure the center ring to its tenon with a drop of cyanoacrylate glue. Fit the threaded end of the end cap through the hole in the clip, then use a vise with wood jaws to carefully press this assembly into the top end of the short pen blank. Squeeze the tip onto the narrow lower end of the long blank; again use your vise to press the twist mechanism, brass end first, into the opposite end of the long blank. Approximately ⅞" of the chrome portion should remain visible. To test this setting, load the refill into the twist mechanism, and turn the mechanism. The ballpoint should extend beyond the tip the same distance as in a typical pen. Push the pen top and bottom together, and write away.

Buying Guide

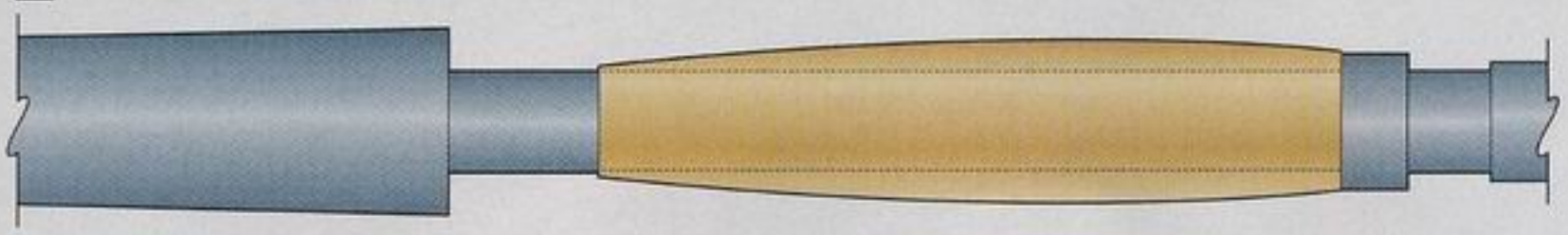
All of the supplies you need for turning a pen, including blanks, mandrels, bushings, drill bits, and pen kits, are available from Woodcraft (call 800/535-4482), Penn State Industries (800/377-7297), or Berea Hardwoods (440/234-7949).

Written by **Jim Pollock** with **Rich Bright**
Photographs: **Marty Baldwin**
Illustrations: **Roxanne LeMoine; Lorna Johnson**

2 MANDREL ARRANGEMENT



3 TYPICAL PROFILE OF UPPER PIECE



Furnituremaker Dale Peel sits surrounded by a variety of pieces of Mormon Pine furniture, an eclectic style developed by Utah's early settlers.

Frontier Woodworking Lives Again

Utah craftsman Dale Peel combines old-world techniques with modern tools to re-create distinctive, rugged furniture in pine and cottonwood.

Dale Peel's Mt. Pleasant, Utah, workshop hums with the whir of modern stationary woodworking equipment. His furniture, on the other hand, reflects the traditional hand-tooled pieces made by Mormon pioneers who settled this remote region more than 150 years ago.

Necessity breeds tradition

Those settlers followed Brigham Young to the area surrounding the Great Salt Lake starting in the late 1840s. Until the transcontinental railroad reached the area some two decades later, the Mormons relied upon themselves for virtually all their needs—including furniture. Fortunately, the early band of pioneers included a number of woodworkers. Brigham Young himself was a cabinetmaker. The craftsmen set about applying their tools and know-how to the materials available in their new home.

Hardwood pickings were exceedingly slim. Groves of cottonwoods grew along desert streams and scrubby Western oaks clung to some hillsides. Far more abundant were the mountain forests of Douglas fir, spruce, and ponderosa pine.

Spruce, dubbed "white pine," and ponderosa pine, called "yellow pine," were the mainstays of the area's furnituremakers. Both proved easy to craft. But the newcomers worried that neither wood was particularly strong. "Actually, a lot of the woods they used here, especially cottonwood and fir, had as much tensile strength as the hardwoods they had known," Dale says.

Unaware of that fact, the pioneer woodworkers beefed up furniture parts and joints to create pieces suited to the rigors of frontier life. "Look at those chairs," Dale says, pointing to a head-high stack of unfinished chairs, *below*. "See how thick the legs are, and the seat? Not quite as delicate as a traditional Windsor chair," he adds, grinning. The furniture style became known as "Mormon Pine."

These sturdy frontier chairs bear little resemblance to the Windsors that inspired them. Though designed for strength, the chairs offer refinements, such as turned cottonwood spindles.

Influences from far and wide

Mormon Pine furniture contains a mix of styles, based on the influences of its makers. Dale's straightforward bedside tables, for example, seem classically Shaker, while some of his casework pieces could pass for Hoosier cabinets. And his sofa beds, with their bandsawn legs and backs, have the lines of old-fashioned Scandinavian furniture. In fact, many Scandinavian woodworkers were among the early settlers.

Mormon Pine furniture as a whole features some common characteristics, Dale claims. Cabinet doors often rely on through-mortise-and-tenon joints, often haunched. Drawers and casework feature dovetail joinery. Those dovetails, in massive form, are a key structural and design element of some of Dale's pieces. (See *Machine dovetails with a handcrafted look* on *page 86.*) Turned legs and spindles also help define the look.

Though the softwoods early Mormon furniture builders used were beautiful, many settlers longed for the furniture they'd left behind that had a more elegant style. To appease this interest, some furnituremakers painted the wood in cheerful hues. Other builders mastered applying stain and faux-graining flourishes to make pine resemble figured hardwoods. They often replicated oak, walnut, and mahogany, and took pride in producing authentic renditions of intricate burl and crotch figure.

Love at first sight

A member of the Church of Jesus Christ of Latter-day Saints (the Mormons), Dale became intrigued after reading a magazine article about Mormon Pine furniture. "It sparked me," Dale says. He began experimentally crafting the old furniture, and soon found himself building and selling it to a growing crop of customers.

Dale crafts his pieces (both reproductions and fresh designs in the style) in a converted cheese factory 60 miles south of Provo. An artist as well as an accomplished woodworker, he began building furniture full time in 1991.

Dale Peel

Profiled drawer fronts and built-up moldings add elegance to this otherwise understated sideboard. Bluing solution ages the steel hinges to an antique hue.

Adding to his furnituremaking, Dale is particularly deft at graining—using paints, glazes, and stains to lend softwoods the appearance of highly figured species. Get a glimpse of how he creates his magically accurate faux crotch mahogany pattern in *Mahogany in a can* on *page 88*.

The woods to choose

Dale buys most of his wood from local mills. Lately, he primarily buys spruce,

Machine dovetails with a handcrafted look

Pieces in Dale Peel's Great Basin furniture line, such as the four-drawer chest, *below*, feature pine components up to 2" thick. He joins casework and drawers with massive dovetails. They feature the custom spacing, narrow pin openings, and irregular sizing that are the hallmark of hand-cut dovetails. But Dale crafts dovetails on the tablesaw and bandsaw, and then fine tunes them with a chisel. Here's how:

There's no need to guess what holds this four-drawer chest together. The massive dovetails lend a hand-tooled look that harken back the days of limited resources.

1 Dale plows out waste at each pin location using a homemade jig. It features two vertical fences, arranged in a sharp vee, that place the workpiece at a 7° angle to the dado blade. He slides it back and forth over the blade, and plows out waste up to the scribe line, forming one edge of each pin.

Note: *Dale uses a 10-inch dado set to make very deep cuts. You may need to reduce the thickness of the sled to ½" to achieve enough depth with an 8" dado set.*

fir, and cottonwood. He relies less on ponderosa pine than he used to. Occasionally that wood caused problems due to sap bleeding through the finish on completed furniture.

Dale turns many of his spindles from cottonwood, a species usually spurned by most woodworkers. If properly dried to between 6 and 8 percent moisture content, he finds cottonwood easy to tool and plenty strong for the stresses to which it will be subjected.

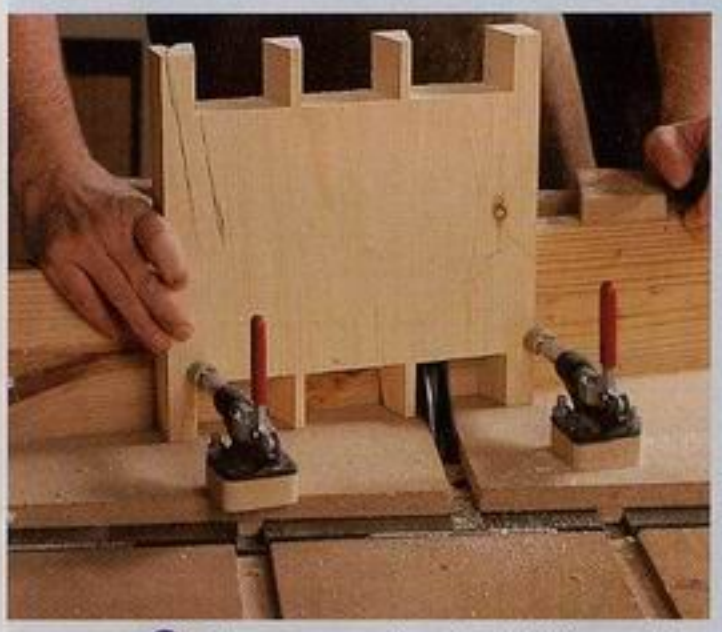
In his cottonwood stacks, Dale frequently comes across slabs of highly figured wood. He saves those and uses them to make tops for decorative boxes.

Character marks mimic old age

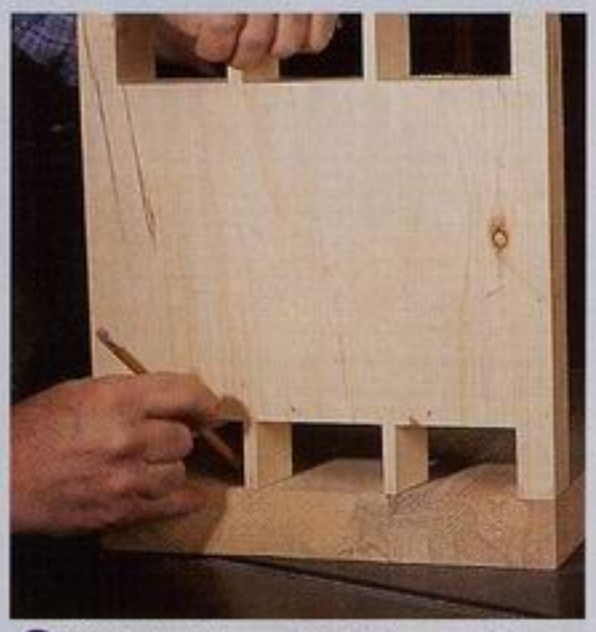
Antique Mormon Pine furniture pieces generally exhibit a rich collection of subtle tooling marks, plus welts, scrapes, and scars left in the soft wood by years of hard use. Dale is happy to comply if a client requests that old-time look on his new pieces.

He gives tabletops the hand-tooled look with long sweeps of his old Stanley smoothing plane. The plane blade with slightly rounded corners etches the wood with barely visible ruts. Dale also leaves dovetail scribe scratches on casework. He pounds in distress marks using an old wood mallet impregnated with flattened nails and other bits of metal.

Distressing often extends to the finish, too. If Dale paints the piece, he lays down a base coat of oil-based paint, then follows it with another coat in a different color. Then he sands and files through the topcoat here and there (usually in high-use areas such as around knobs) to reveal the underlying paint layer. By applying a dark glaze, and then wiping much of it off, he creates shadows in corners and other areas in which old furniture gathers dirt. Dale's goal is to simulate aged milk



2 Dale reverses the dovetail jig on his tablesaw, positioning the other face of the fence toward the blade. Then he cuts the opposite angle on the workpiece to complete each pin.



3 With the pins cut, Dale lays out the mating tails. He stands the panel on edge on top of the panel to which it will join. Then he traces the outline of each pin to mark the tail locations.

4 To make the tails, Dale moves to his bandsaw. He cuts the sides of the tails freehand, just inside the layout lines. Using a ¾"-wide blade helps him create straight cuts in the thick wood.

5 To complete the tails, Dale uses a chisel and mallet to remove the waste between the bandsaw cuts and the layout lines. He chisels halfway through the board's thickness from each side, and turns the panel over frequently as he works. He angles the chisel to form shallow hollows on the shoulders of each tail. This ensures a snug fit when the panels are joined.

6 Finally, Dale tamps the panels together to check the fit. If necessary, he knocks the joint apart to fine-tune the tails. "It's time consuming," Dale advises of his dovetailing technique, "but it's not all that hard to do." When the fit is right, he glues the joint.

paint. He avoids using actual milk paint, though, because he finds it more difficult to distress.

To achieve the right look, Dale mixes his own stains, paints, and glazes, using a variety of latex and oil bases. Finally, he sprays on several coats of lacquer over the painted finishes (not on faux finishes; see the sidebar *below*) to add durability.

Most early Mormon Pine furniture was grained. The faux finishes were very popular in Europe and America in the mid-1800s. Dale turns to a variety of tools to emulate quartersawn white oak, cherry, and the many other desirable hardwoods that grainers copied. These include anything from bristle brushes specially designed for the task, to bits of cardboard and homemade wood combs.

Dale depends on his artist's eye for creating authentic graining. However, he's confident that with enough experimentation and practice, most home woodworkers can achieve satisfying results.

"Just keep working with it," Dale says, understating the difficulty of a process he perfected during long hours of practice. His core advice to would-be grainers is to read a few faux-finishing books. Check out *The Art of Faux* by Pierre Finkelstein, and see *WOOD®* magazine issue 129 to learn more about the process. Then practice until you get something you really like.

Written by **George Hendrix**
Photographs: **Patrickcone Photography**

Mahogany in a can

1 Dale begins by applying a base coat of flat, acrylic latex paint in a pink color. It will become the highlight color after darker layers are applied. After this base coat dries, he roughly pencils in where those layers will go to emulate mahogany flame or flare.

Surprise! This beautiful mahogany blanket chest is really made of pine. You'd never know it, though, unless you carefully examined its faux-grain finish. Realistic graining requires research and practice. With enough hours of practice, though, you too will be able to emulate intricate patterns, such as this faux crotch mahogany.

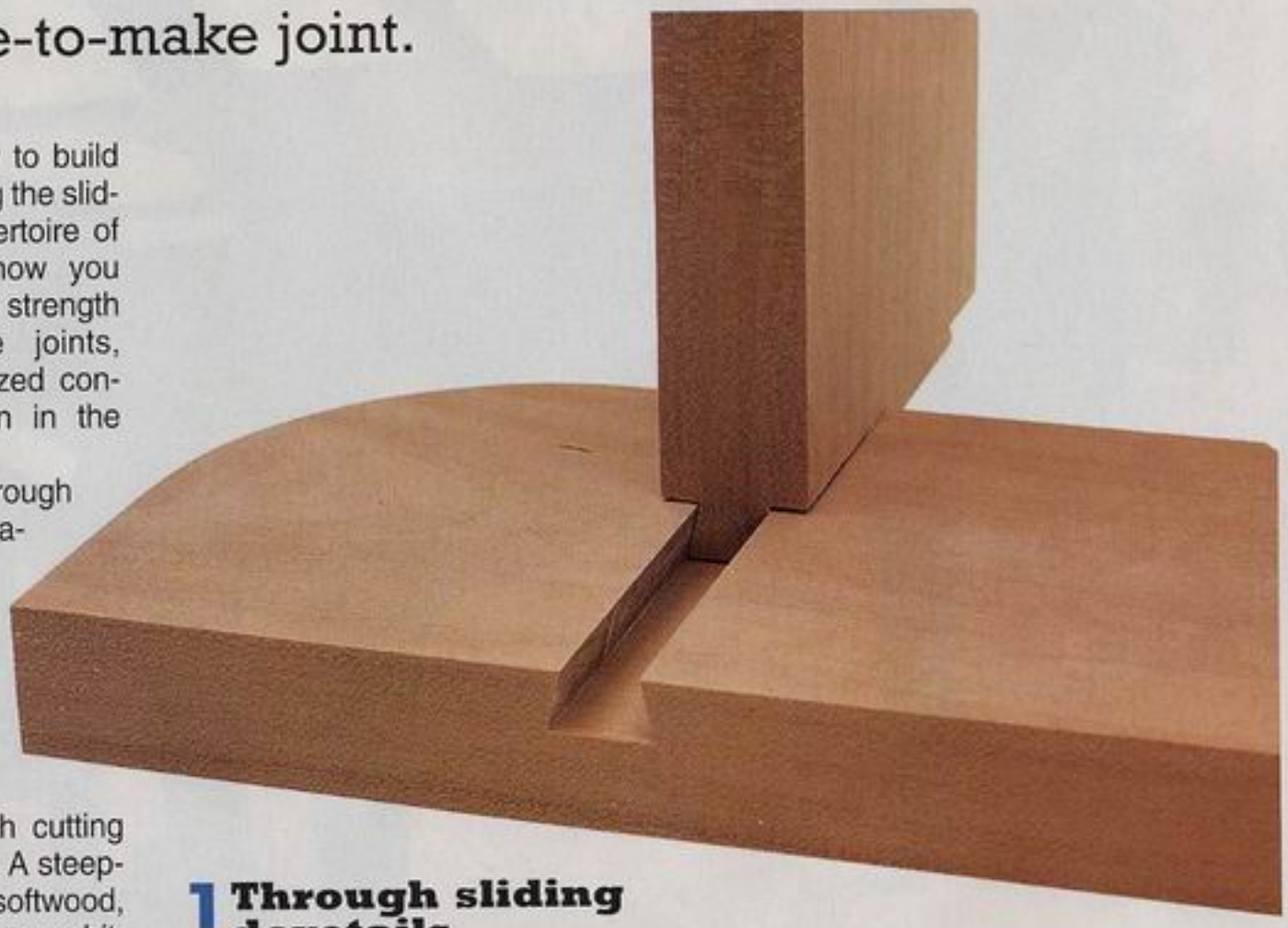
2 Dale pours a quarter-cup or so of McCloskey's alkyd oil-based glaze and stirs in dabs of burnt umber and burnt sienna tinting color (available at paint, art supply, and some hardware stores) to create a semitransparent burgundy glaze. A bit of naphtha solvent thins the mixture. When the color is right, he uses a graining brush to apply the glaze to the entire panel. He follows the pencil reference lines first, then brushes over the entire panel.

3 Dale mixes additional pigments and glaze on a piece of waste cardboard, striving for a darker color. Then he follows the flare pattern with that mixture. This adds depth and variety to mimic real mahogany's subtle variations.

4 As the solvent in the glaze begins to evaporate, the mixture stiffens enough to hold the graining. Experience pays off big here, as Dale cuts into and through the color layers using small bits of cardboard and wood to reveal the lighter tones underneath. He drags patterns into the glaze, emulating the random cross grain and rays in crotch mahogany. Dale smooths and blends the colors until he's satisfied with the pattern. Later, he'll coat it with varnish. Dale doesn't use lacquer on his faux finish because it lifts the graining.

the never-fail sliding dovetail

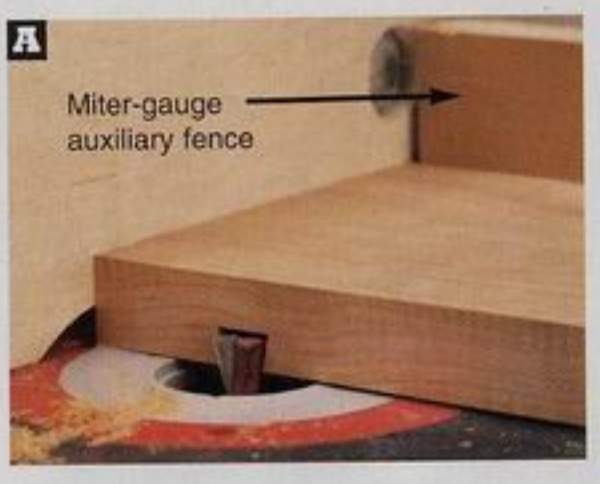
Whether showy or concealed, it's a strong, functional, and simple-to-make joint.



If you use dovetails only to build drawers, consider adding the sliding dovetail to your repertoire of joint-making skills. We'll show you how to apply its exceptional strength to concealed drawer-face joints, shelving units, or a specialized connection like the one shown in the tabletop lamp on *page 58*.

You'll learn how to make through sliding dovetails and two variations of stopped sliding dovetails. To get started, you'll need a router mounted in a table and a standard dovetail bit. You can choose among dovetail bits with cutting diameters from ¼" up to ¾", and with cutting edges angled from 7° to 18°. A steeper angle adds reliability in softwood, and narrow stock calls for a narrow bit. We use a bit with a ½" cutting diameter and a 14° angle to make sliding dovetail joints in ¾" hardwood.

When you need a dovetail groove longer than 6", use a tablesaw or a straight bit in your router to plow a groove down the center of the planned dovetail joint. Make it ⅛" wide and nearly as deep as the dovetail groove will be. This step avoids the problem of sawdust packing tightly into the dovetail groove as you rout it.



An auxiliary fence on your miter gauge keeps the workpiece aligned, and also reduces tear-out on the back side.

1 Through sliding dovetails

A through sliding dovetail extends from one side of the joint to the other, leaving the distinctive dovetail shape visible at both ends of the joint. It's the quickest sliding dovetail joint to make, and adds both visual interest and strength to projects such as display shelving.

To make a typical through dovetail, set the bit to cut a groove 5/16" deep. Adjust the router-table fence so it stops the workpiece to help you cut the groove the desired distance from the end of the workpiece. Make sure the fence sits parallel to the miter-gauge slot by clamping a ruler or piece of scrap to the gauge and checking to see that it contacts the fence along its full length.

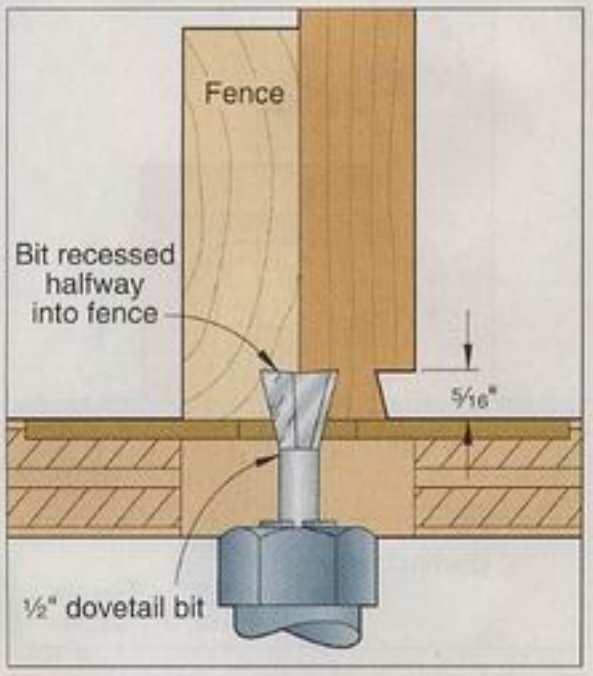
Attach a wood auxiliary fence to the miter gauge, and turn on the router. A smooth sliding dovetail depends on a perfectly straight groove, so hold the workpiece firmly down on the table and against both fences. Make the cut as shown in **Photo A**, allowing the bit to pass through the auxiliary fence.

If you want to place a matching dovetail at the other end of the workpiece, leave the router-table fence unchanged. Flip the board around with the same side down, butt it against both fences, and rout again. To make dovetails in a pair of stiles for a series of shelves, cut a groove in each stile at one router-table fence setting, then adjust the fence for the next pair of grooves.

Now that you've established the size of the groove, it's time to cut a dovetail tenon that matches precisely. Leave the dovetail bit height unchanged, but adjust your router-table fence.

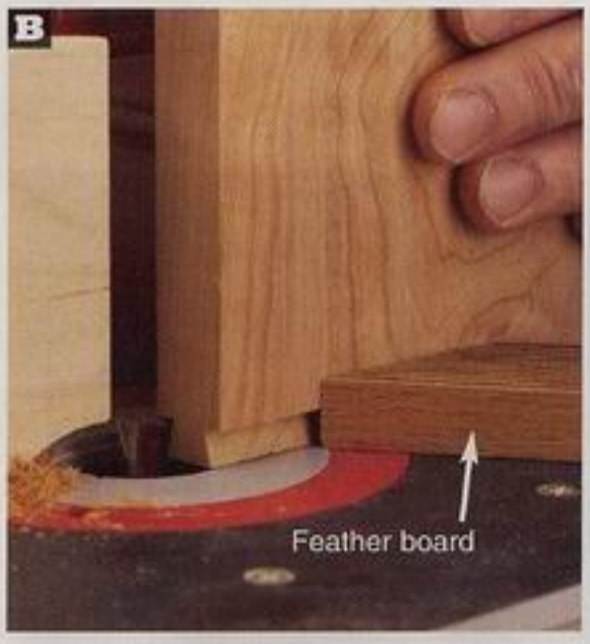
If you have a split fence, bring the two halves of the fence as close to the bit as possible without contacting it, leaving only the outside portion of the bit exposed. If you have a single-piece

1 TENON SETUP

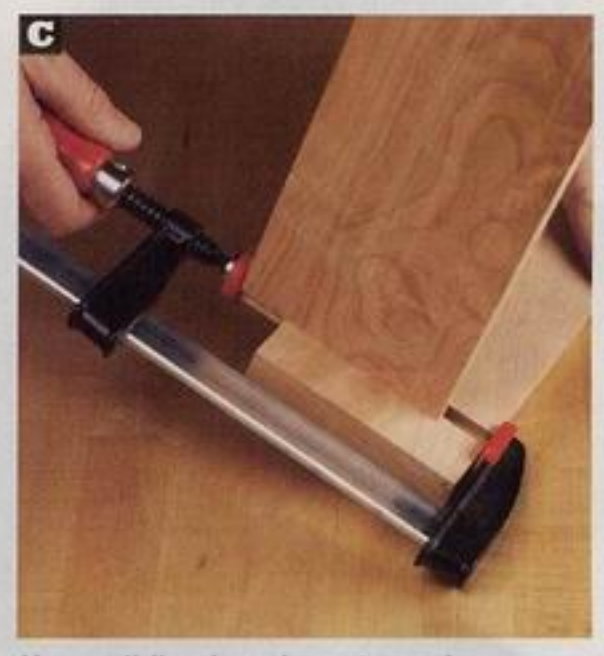


fence, attach a sacrificial auxiliary fence to it. Turn on the router, and carefully move the fence forward to recess the bit. See **Drawing 1** for details, but remember that the proper fence setting depends on the thickness of the workpiece.

With a piece of scrap that's the same thickness as your workpiece, make a trial cut with the aid of a feather board, as shown in **Photo B**. Cut one side of the tenon, flip the workpiece around, and cut the other tenon side. Test this sample in the groove and adjust the fence until the tenon slides into the groove snugly but smoothly. When it does, cut your tenon on the workpiece.



Use a feather board when forming dovetail tenons; its pressure ensures a smooth, straight cut for a snug joint.



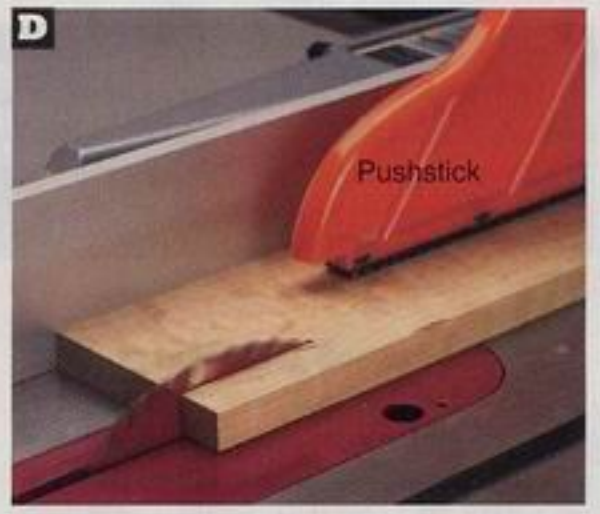
Use a sliding bar clamp to apply controlled force in a straight line while assembling dovetail joints.

Begin to assemble the joint by spreading a thin coat of yellow glue in the groove. The longer the joint, the more likely you'll need extra pressure to put it together. You can use a dead-blow mallet, but see **Photo C** for a better way. A well-fitted dovetail joint doesn't require clamping while the glue dries.

2 Stopped dovetails in drawer fronts

Choose a stopped sliding dovetail, visible at only one end, when you want to hide the joint or you can't make a through cut. But a problem arises when you need to cut a stopped dovetail at each end of a workpiece, such as a drawer front. Safety requires you to work from right to left on the router table, but the typical table has only one miter-gauge slot. Here's the solution.

Make your drawer front at least 3/16" over its final width. Then, rip away the top 1" at the tablesaw, as shown in **Photo D**, and remove the saw blade marks at the jointer. Now, cut a pair of through dovetail grooves. Glue the top piece back in place, as shown in **Photo E**, creating two stopped grooves. Trim the drawer front to final width. Finally, make dovetail tenons on your drawer sides, trim off one end of each tenon as shown on *page 92*, and slide them into place.



Making this cut with a thin-kerf blade helps you get a better grain match when you glue the pieces back together.

Keep the faces aligned perfectly when you reassemble the pieces. You'll avoid lots of scraping and sanding.

Mission lamp makers take note: Follow these steps to join the lamp-shade supports to the post. See full project instructions on *page 58.*

3 Stopped sliding dovetails

The table lamp on *page 58* calls for a sliding dovetail joint with a stopped end. We'll use that project for our example of this joint, but the same principles apply in other projects, such as pedestal tables.

Set your router-table fence to center the dovetail bit on the post, as shown in **Drawing 2**. Clamp a stopblock on the outfeed side of the fence 1" from the bit's center. (This will result in a groove roughly 1⅛" long.) Now, rout the groove on all four sides of a test piece the same dimensions as the post, as shown in **Photo F**, always holding the workpiece firmly against the fence and the table. When you're satisfied with the test sample, make your cut or cuts in the workpiece. At the end of each cut, switch off the router and wait for the bit to stop before sliding the workpiece back, if your switch is easily accessible. If not, carefully slide the workpiece back, holding it tightly against the fence, while the bit continues to spin.

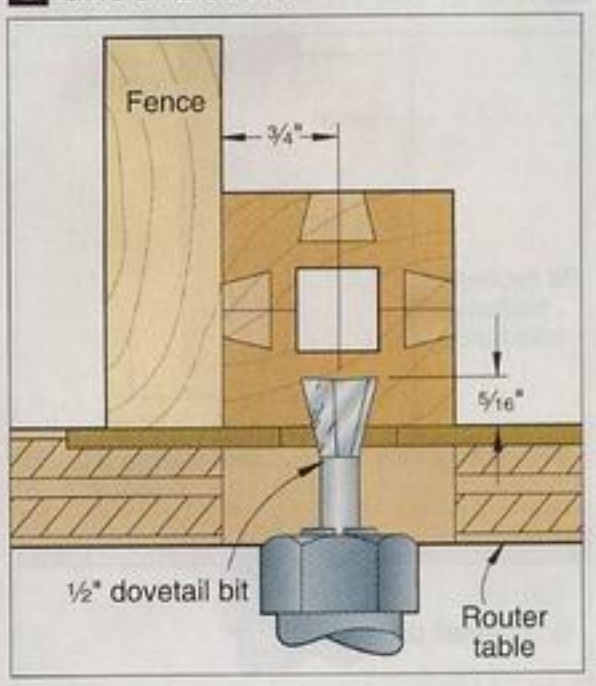
Leave the bit height unchanged. Now, form a dovetail tenon on a test piece, as described on *page 90.*

Now, because the groove is shorter than the width of the shade support, you need to trim the tenon to fit. Measure and mark the tenon, and then remove the waste with two handsaw cuts, as shown in **Photo G.**

Written by **Jim Pollock** with **Charles I. Hedlund**

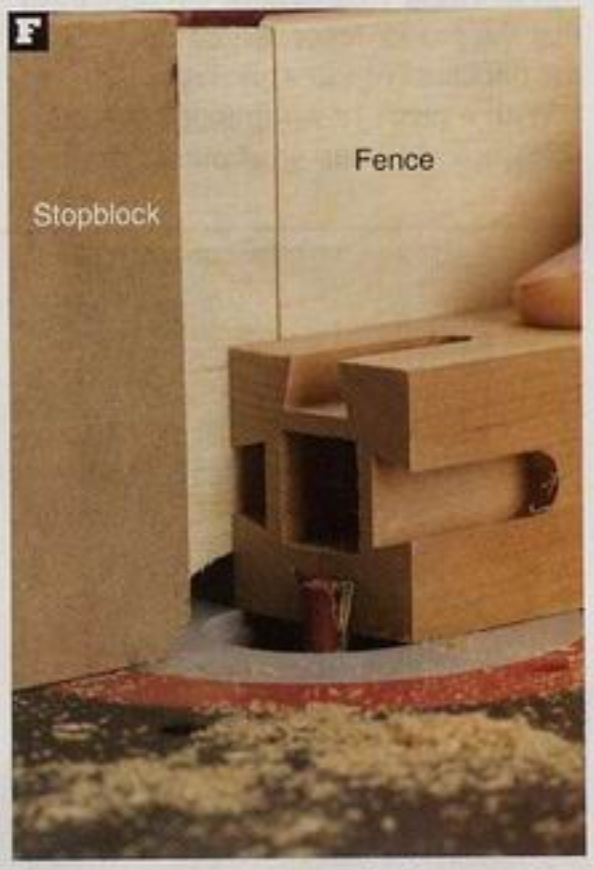
Mark the waste for your stopped tenon, saw across the base of the tenon, then cut as shown here. We used a Japanese crosscut saw.

2 GROOVE SETUP



ROUTING A SLIDING DOVETAIL
Here's the setup for making the mission lamp post. Use the same arrangement, adjusted for specific workpiece dimensions, to make any sliding dovetail.

F



Once the fence and stopblock are set correctly, cutting the mission lamp's stopped dovetails is simple.

G

patio-perfect planter

Spruce up your outdoor spaces with this 19"-tall, cedar-trimmed planter. It accepts up to a 16" square or round pot for showing off your colorful plantings.

As an option, you can build the planter with scrollsawn tree onlays that match the cutouts used on the settee, presented in issue 125 (if you don't have this issue, see *page 112* to obtain settee plans). The tree motif is also featured in an Adirondack chair and footrest in the next issue.

For the lumber and other items to build this project, see *page 96*.

Start with the box

1 Cut the sides (A) to the size listed in the Materials List. Glue and clamp the sides together, overlapping the ends where shown on **Drawing 1**. Use an exterior-type adhesive, such as Titebond II or polyurethane glue. Check for square. Then drill countersunk shank holes where shown, and drive the screws.

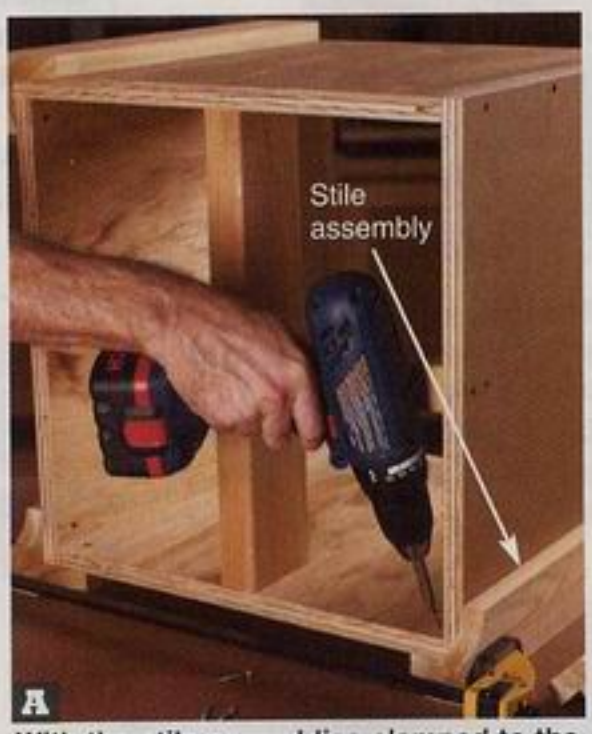
2 Cut the support rails (B) to size. Using a dado blade in your tablesaw, cut a 1½" notch 1¾" deep in the center of each rail. Glue and screw the rails together. Place the rails in the bottom of the box, and secure with screws, where shown. If you plan to make the tree onlays instead of the center stiles (F), be sure to keep these screws within 2" of the box's bottom so they'll be hidden by the bottom rails (E).

Add the trim

1 Cut the wide stiles (C) and narrow stiles (D) to size. Mark a 1¼" radius at the bottom of a narrow stile (either corner is fine), where dimensioned on **Drawing 2**. Bandsaw and sand the radius to shape. Using this stile as a template, mark the radius on a corner of each of the remaining narrow and wide stiles. Bandsaw and sand these pieces.

2 Glue and clamp the narrow and wide stiles together, where shown on **Drawing 1**. Note that the stile assemblies (C/D) at adjacent corners are a mirror image. When the glue dries, screw the assemblies to the box, as shown in **Photo A**, with their top edges flush.

3 From ¾"-thick cedar, cut eight 3×14" pieces for the top and bottom rails (E). Trim each rail's length to fit



With the stile assemblies clamped to the box (no glue), drill countersunk shank holes in the box, and drive the screws.

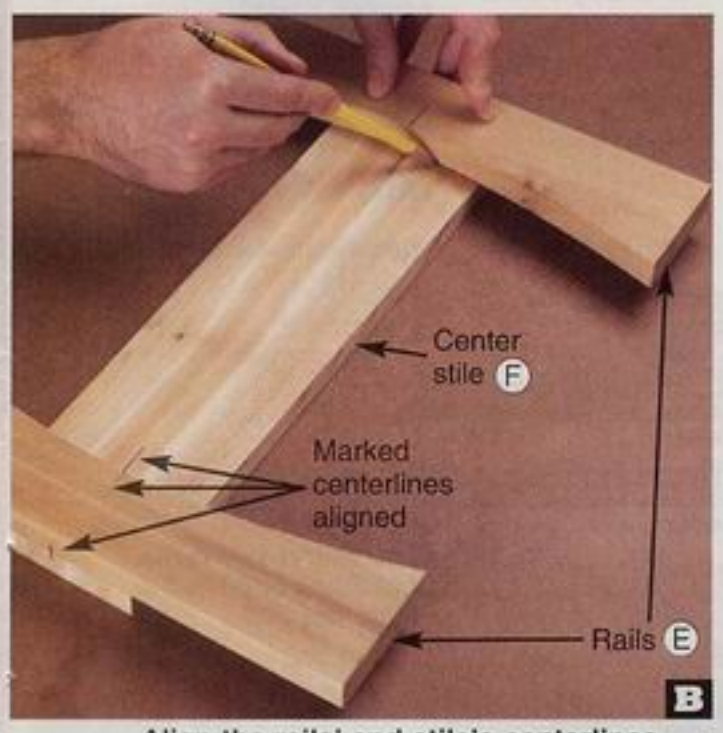
between the stile assemblies (C/D). Mark the rails and box so you'll install the pieces in the same locations later.

4 Using a flexible metal ruler or a thin strip of wood as a fairing strip, mark an arch on a rail (E), where dimensioned on **Drawing 2**. Bandsaw and sand the arch to shape. Using this rail as a template, mark the arch on the remaining rails; then cut and sand them.

Note: If you're planning to make the tree onlays instead of the center stiles (F), proceed to step 7.

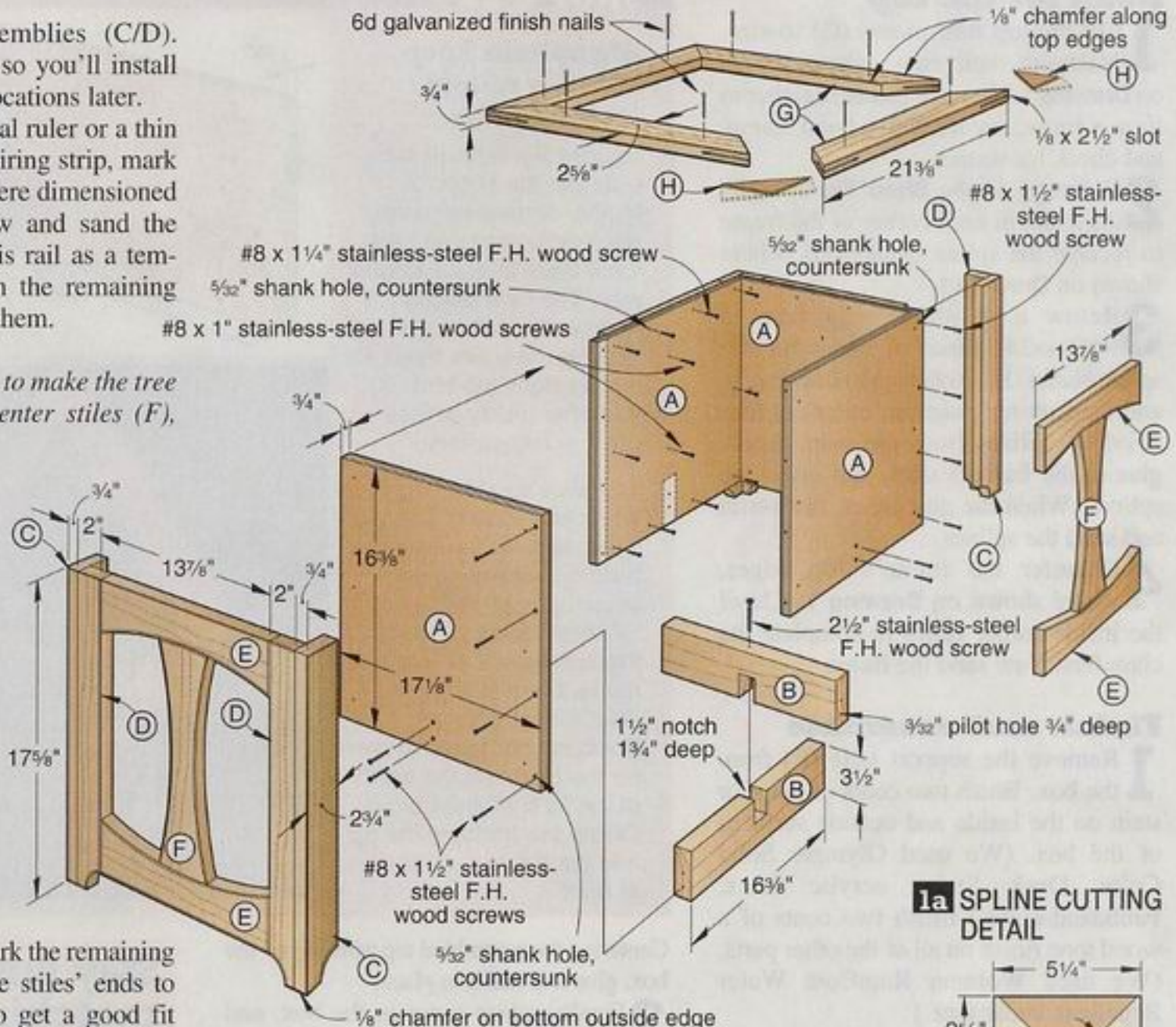
5 From ¾"-thick cedar planed to ⅝"-thick, cut four 4×16⅜" pieces for the center stiles (F). Mark centerlines on the stiles and rails (E), where shown in **Photo B**. Position a top and bottom rail on a stile, and mark the rails' contours on the stile, as shown. Identify the stile to match it to the rails, and keep the parts together. Repeat this process to mark the remaining stiles. Now, bandsaw the stiles' ends to shape, and sand them to get a good fit between the rails.

6 Mark the arches on the sides of a center stile (F), where dimensioned on **Drawing 2**. Bandsaw and sand the arches to shape. Use this stile to mark the arches on the remaining pieces; then cut and sand them.

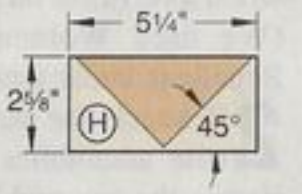


Align the rails' and stile's centerlines and their top and bottom edges. Scribe each rail's arch contour onto the stile.

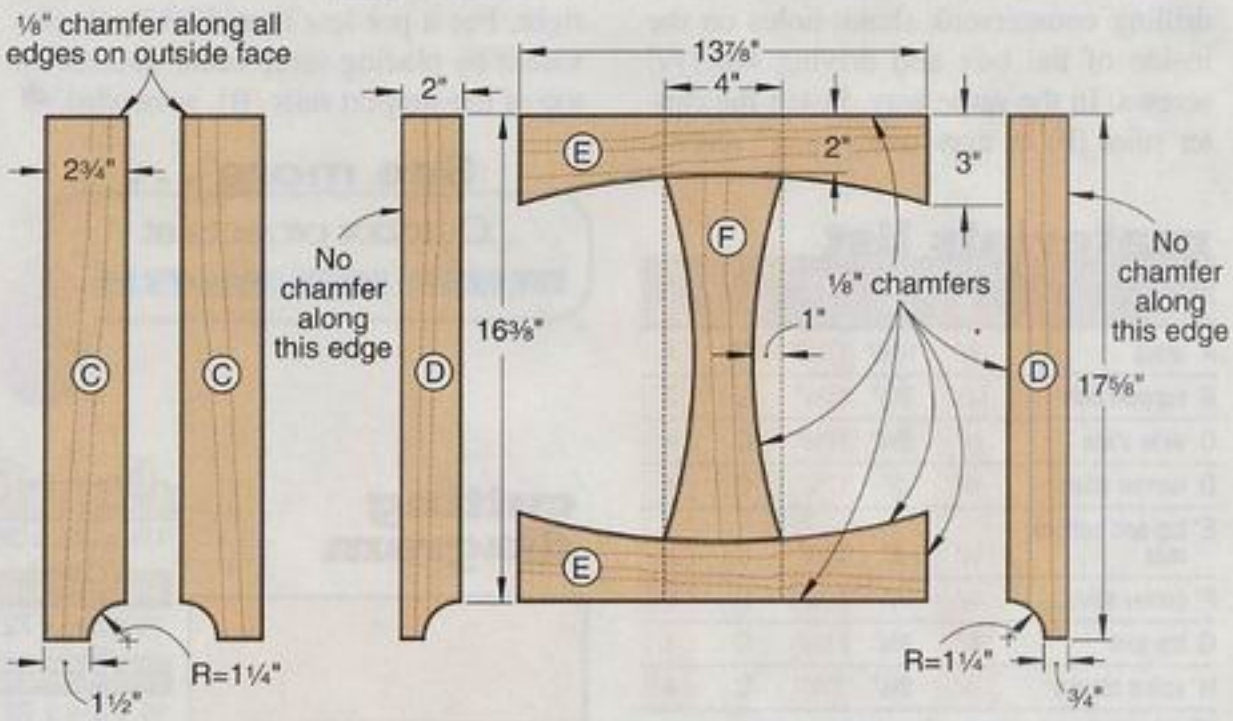
1 PLANTER EXPLODED VIEW



1a SPLINE CUTTING DETAIL



2 SIDE VIEW



7 Remove the stile assemblies (C/D) from the box, and mark their locations. Sand all of the stiles and rails to 220 grit. Then chamfer the edges of the parts, where shown.

8 **Tree onlay option:** Make four copies of the full-size tree pattern on the *WOOD PATTERNS*® insert. Adhere them to a ⅝×4½×34" piece of cedar with spray adhesive. Bandsaw the trees to shape, and sand their edges smooth. Chamfer along their outside edge, where shown on the pattern. Set the trees aside.

Head for the top

1 Cut the top trim pieces (G) to size. Miter-cut their ends, where shown on **Drawing 1**. Glue the pieces together to form a frame, secure with a band clamp, and check for square.

2 Referring to the **Shop Tip** at *right*, cut a slot in each corner of the frame to receive the spline blanks (H), where shown on **Drawing 1**.

3 Resaw a ⅛"-thick strip from a ¾×2⅝×24" piece of cedar for the spline blanks (H). Referring to **Drawing 1a** and the Cutting Diagram, miter-cut four 2⅝×5¼" splines from the strip. Apply glue in the frame's slots, and insert the splines. When the glue dries, flush-trim and sand the splines.

4 Chamfer the frame's top edges, where shown on **Drawing 1**. Chisel the inside-corner edges to complete the chamfers. Now sand the frame.

Finish and assemble

1 Remove the support rails (B) from the box. Brush two coats of paint or stain on the inside and outside surfaces of the box. (We used Olympic Solid Color Deck Stain, acrylic latex, Faulkland color.) Brush two coats of a wood tone finish on all of the other parts. (We used Wolman RainCoat Water Repellent, cedar tone.)

2 Reattach the support rails (B) and stile assemblies (C/D) to the box. Fasten the top and bottom rails (E) by drilling countersunk shank holes on the inside of the box and driving #8×1¼" screws. In the same way, fasten the center stiles (F) or trees using #8×1" screws. Centering the assembled top trim (G) on the box, glue and nail it in place.

3 Finally, place a pot in the box, and plant flowers. At a home center, we found a 16"-square, 13⅝"-tall pot with a self-supporting rim that fits the box just right. For a pot less than 13⅝" tall, elevate it by placing scrap cedar spacers on top of the support rails (B), as needed.

materials list

Part	FINISHED SIZE T	W	L	Matl.	Qty.
A sides	¾"	16⅜"	17⅛"	MP	4
B support rails	1½"	3½"	16⅜"	C	2
C wide stiles	¾"	2¾"	17⅝"	C	4
D narrow stiles	¾"	2"	17⅝"	C	4
E* top and bottom rails	¾"	3"	13⅜"	C	8
F* center stiles	⅛"	4"	12⅜"	C	4
G top trim	¾"	2⅝"	21⅛"	C	4
H* spline blanks	⅛"	2⅝"	5¼"	C	4

*Parts initially cut oversize. See the instructions.

Materials key: MP–medium-density overlay (MDO) plywood, C–cedar.

Supplies: #8×1", #8×1¼", #8×1½", and #8×2½" stainless-steel flathead wood screws; 6d galvanized finish nails; spray adhesive; exterior-type adhesive.

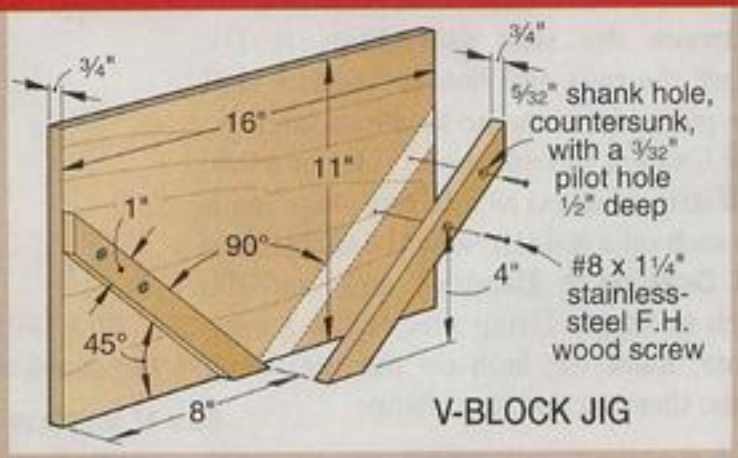
Blades and bits: Dado-blade set, 45° chamfer router bit.

SHOP TIP

Big splines keep exterior miters looking fine

Mitered workpieces subjected to the rigors of Mother Nature will surely open up unless you reinforce them in a substantial way. The best solution is to span the miters with hefty splines, like those for the planter's top trim (G), that offer plenty of face-grain gluing surface.

To safely support your workpiece while cutting the deep slots for the splines, build a V-block jig, as shown *above*. Raise your ⅛"-thick tablesaw blade to the appropriate height for the required slot depth (2½" for the planter). Position your fence to center the blade on the width of the jig's ¾"-thick cleat. Clamp the frame in the jig, and cut the slot, as shown at *right*.



V-BLOCK JIG

See more . . .

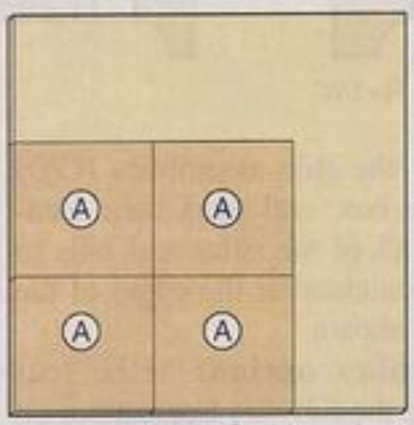
...Outdoor projects at
www.woodstore.woodmall.com/outfurac.html

Stay tuned for the matching tuteur

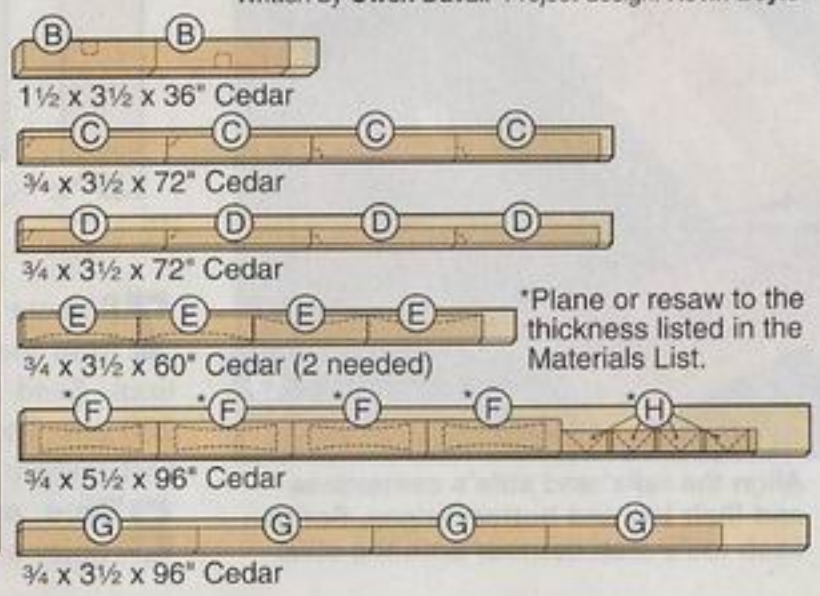
Need a structure for climbing plants? The tuteur, at *right*, is just the ticket. It looks great atop the planter or sitting on the ground. You'll find plans for it in the next issue (June/July).

Written by **Owen Duvall** Project design: **Kevin Boyle**

cutting diagram



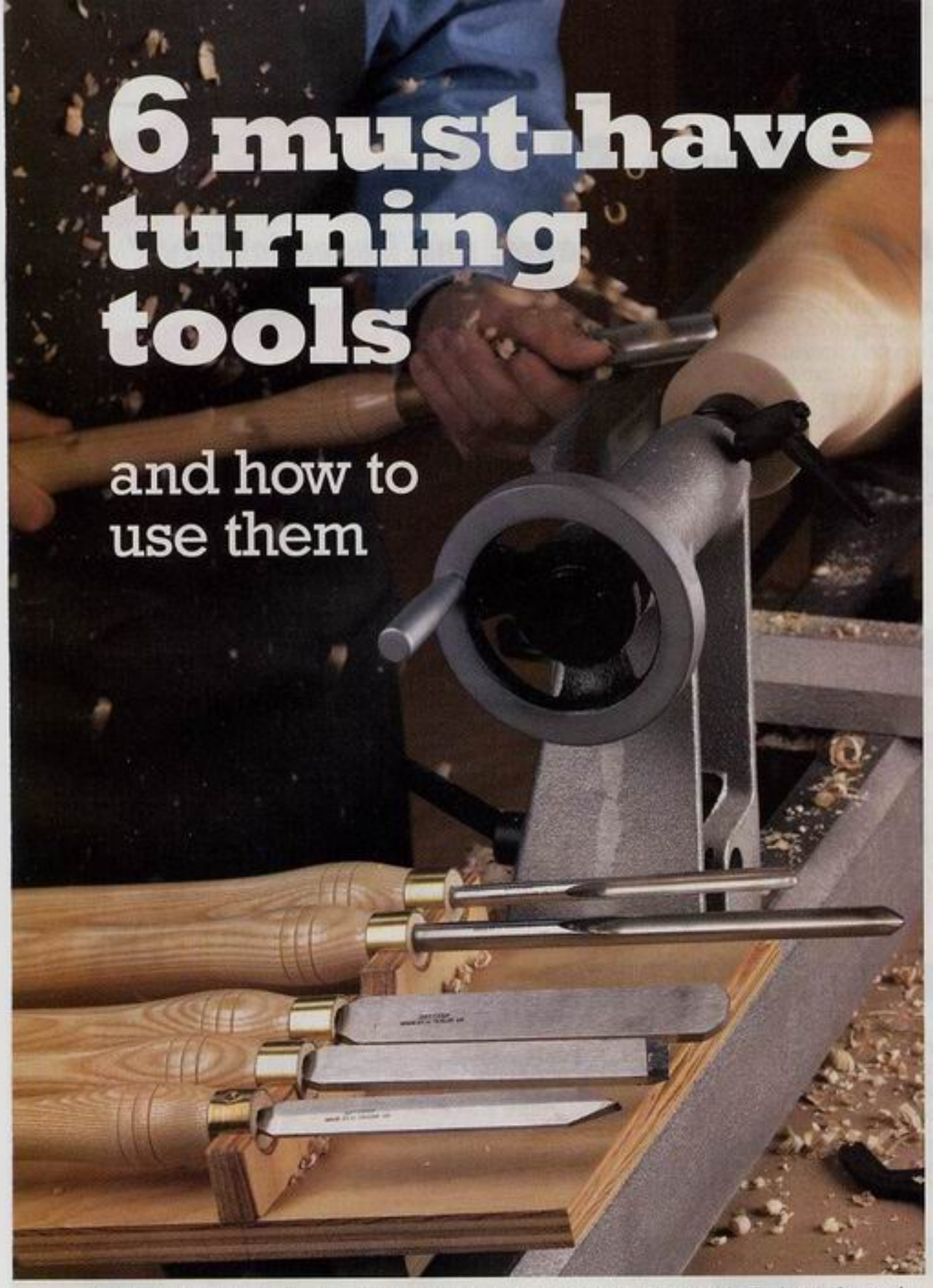
¾ x 48 x 48" MDO plywood



*Plane or resaw to the thickness listed in the Materials List.

6 must-have turning tools

and how to use them



With only six basic tools, you can perform almost any turning task. To keep the tools handy, make the holder shown here and detailed on *page 34*.

Build the fundamentals you need for a lifetime of woodturning success.

Ever feel confused about which turning tools you really need? Fancy, specialized tools abound; but, thankfully, you can craft a variety of turned projects with just a basic set. For advice on this topic, we turned to our old friend and professional turner Phil Brennion of Chino Valley, Arizona. Here's his advice about which tools you should buy, and how to use each one.

Four rules that woodturners live by

Before getting into the specifics of each tool, keep in mind these four basic selection and usage guidelines.

Rule 1: Purchase tools with high-speed-steel blades. Why? They hold an edge better, giving them more life than less-expensive carbon steel. The Artisan brand we purchased (from Craft Supplies USA, 800/551-8876; www.woodturnerscatalog.com) cost between $30 and $50 each, for a total of about $200. That's a small investment for six tools that will last for many years.

You'll find most turning-tool dealers offer prepackaged sets that carry a slightly lower per-tool price. Most sets, though, are sold as a "spindle-turning set" or a "faceplate-turning set." You're likely to dabble in some of both types of turning, and buying two sets means you'll get some duplicates, yet may still lack a few of the tools we recommend. So buy tools individually to get just what you need and nothing else.

Rule 2: Start with smaller tools. Most turning tools come in a variety of sizes, and the bigger ones don't cost much more than the smaller ones. So, you may think, unless you are creating small details, that buying bigger tools makes more sense. Sure, a bigger tool removes stock faster, but it's harder to finesse and more likely, at least in a beginner's hands, to catch unexpectedly in the spinning wood.

Phil Brennion notes many cases of students struggling with a ½" bowl gouge. When he hands them a ⅜" bowl gouge instead, they have much more success controlling the tool.

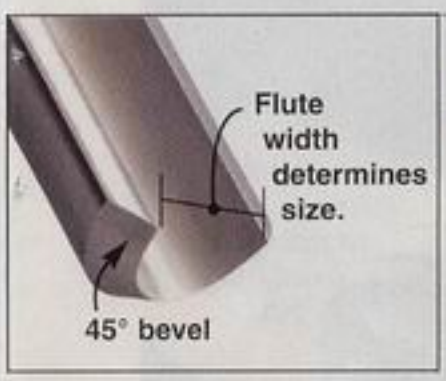
Rule 3: The tool must remain in contact with the lathe's tool rest. Make sure you firmly plant the tool's blade on the rest before the cutting edge touches the wood. Fail to heed this rule, and the spinning workpiece will yank the tip down and throw the handle upward.

Be sure, also, to always grasp the tool firmly, and make light cuts as you learn its characteristics. Time and practice will teach you how to use each tool in more aggressive and complex ways.

Rule 4: Study turning books to learn more about each tool. Every woodturning tool is designed for a specific primary task. As you master this basic use, though, you'll discover other tricks the tool can perform. To learn more about the tools, read two of our favorite books: *Woodturning, A Foundation Course* by Keith Rowly, and Richard Raffan's *Turning Wood*. Both are available through bookstores and woodworking suppliers.

Now, the basic woodturner's toolbox

Catalogs are packed with dozens of specialized tools you may think you need for lathe work. Eventually, you might want some of these woodturning widgets if you get into a particular type of project, such as turning deep, hollow vessels. But rest assured that you can create almost any type of turning with just the following six general-purpose tools.



¾" Roughing gouge

■ **Description:** This straight, deep-fluted tool has a square tip and broad cutting surface.

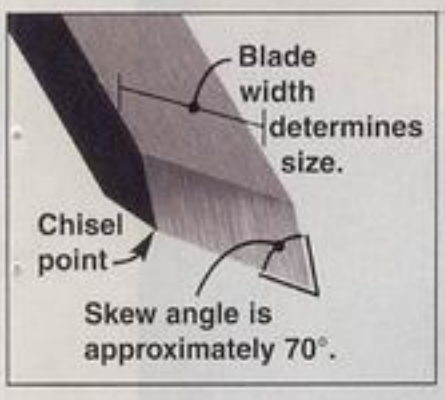
■ **Presentation and cutting:** When using the roughing gouge, approach the workpiece with the tool's flute facing up, the handle down, and the cutting end elevated above the handle's height. This is a bevel-rubbing tool, meaning the bevel on the tip should contact the wood before the cutting edge.

Once the tool bevel rubs the workpiece, raise the handle until cutting begins. Start cutting near the center of the workpiece and work toward each end. As the stock becomes more round, rotate the tool (to about 10 o'clock or 2 o'clock) toward the direction of cutting travel.

■ **Tool-rest height:** At centerline.

■ **Other uses:** Creating shallow coves.

Basic function:
Use this tool to shape square or out-of-round spindle-turning stock into a cylinder.



¾" Skew chisel

■ **Description:** A flat-bladed tool with bevels ground on both faces of the angled tip.

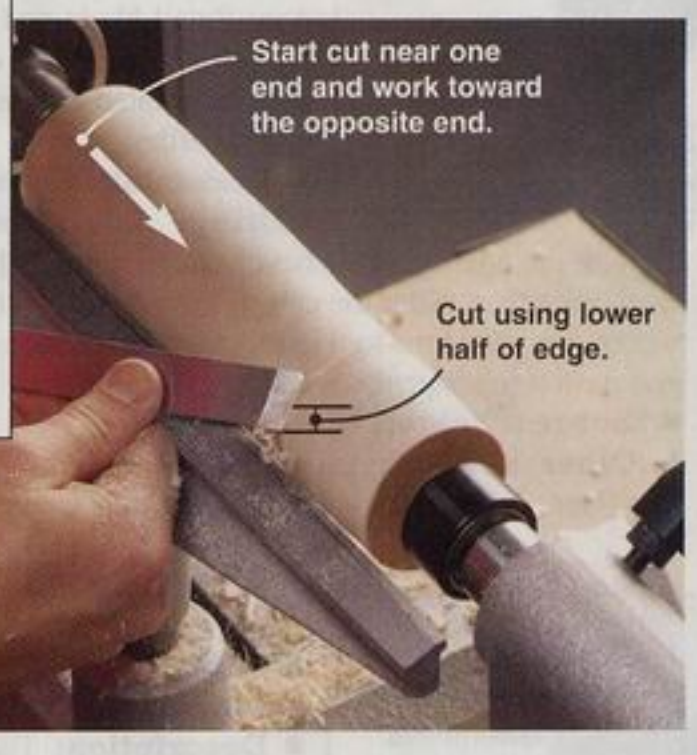
■ **Presentation and cutting:** The skew rides the tool rest on edge, tipped at about a 45° angle. The cutting edge meets the turning stock at a 45° angle, well above the centerline.

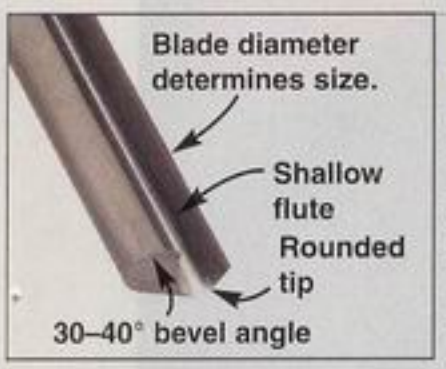
Starting near one end of the workpiece, present the skew so its bevel rubs the surface of the workpiece. Now move the handle away from the workpiece (toward you) until the cutting edge bites. Then, push the skew toward one end of the workpiece with the bevel continuously in contact with the wood.

■ **Tool-rest height:** Just above centerline.

■ **Other uses:** Cutting beads and V-grooves.

Basic function:
The skew evens out high and low spots to shape cylinders. Vary the angle at which the tip meets the workpiece to change the aggressiveness of the cut.





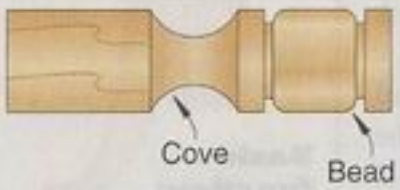
⅜" Spindle gouge

■ **Description:** This tool features a round blade with a shallow flute. The tip has a rounded profile, and a beveled edge.

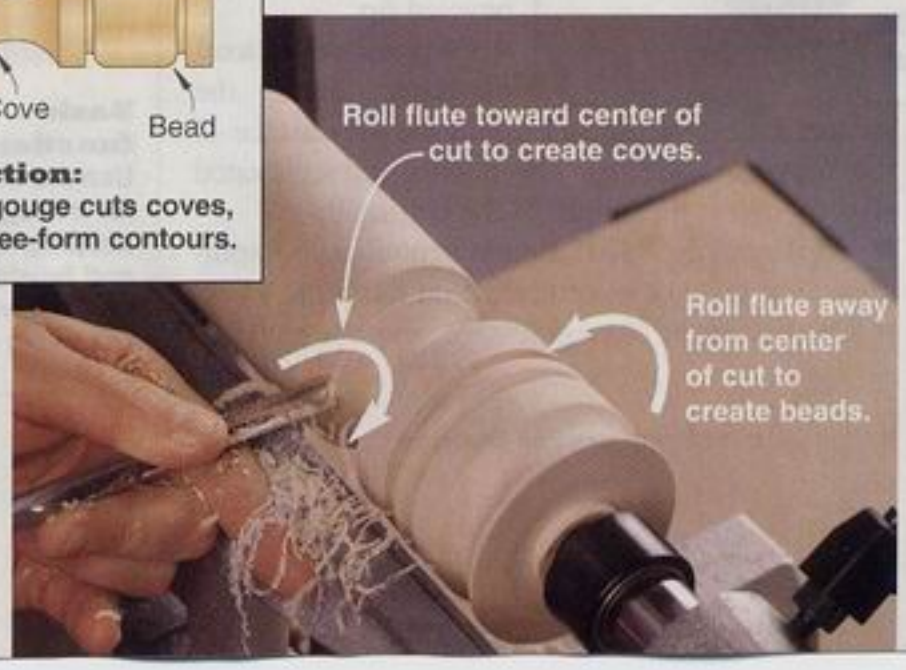
■ **Presentation and cutting:** This also is a bevel-rubbing tool, presented to the wood at or slightly above centerline. Push the spindle gouge along the stock, and rotate the tool as shown.

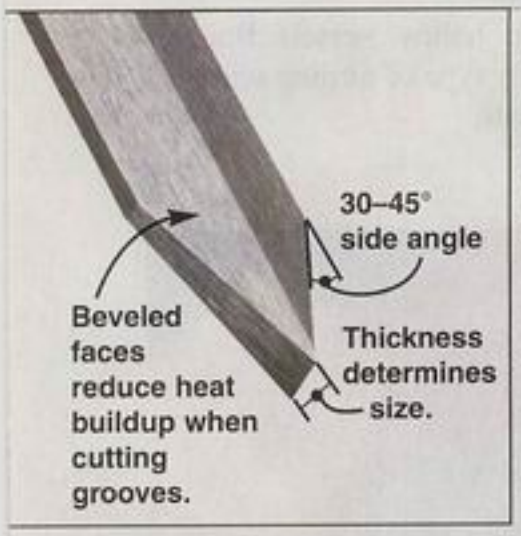
■ **Tool-rest height:** Just below centerline.

■ **Other uses:** Producing shallow hollows on faceplate turnings.



Basic function:
The spindle gouge cuts coves, beads, and free-form contours.





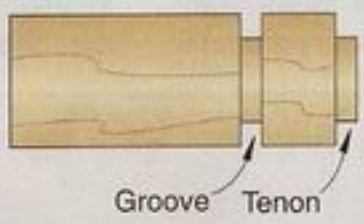
3/16" Diamond-shaped parting tool

■ **Description:** The parting tool's straight, narrow blade features faceted faces and a steep chisel point, which combine to create a "diamond" shape.

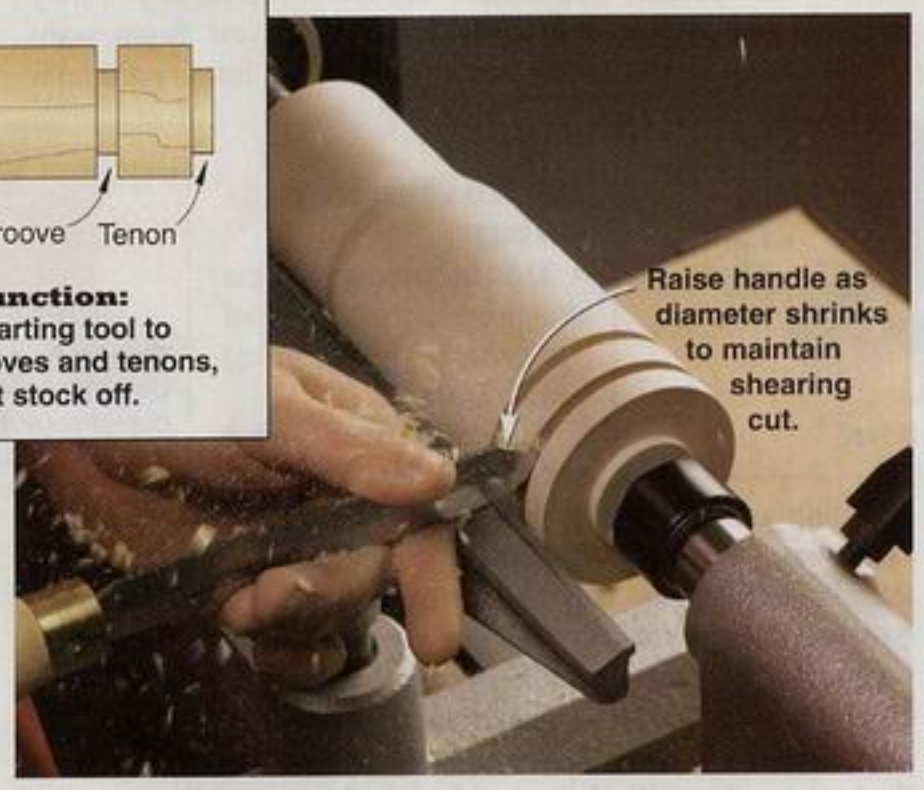
■ **Presentation and cutting:** Place the parting tool on edge atop the tool rest. Push it against the stock at an angle of approximately 90°. As the tip makes contact and begins cutting in a scraping fashion, lower the handle to start a shearing (slicing) cut. Push the tool forward and simultaneously raise the handle to continue cutting as the workpiece diameter decreases.

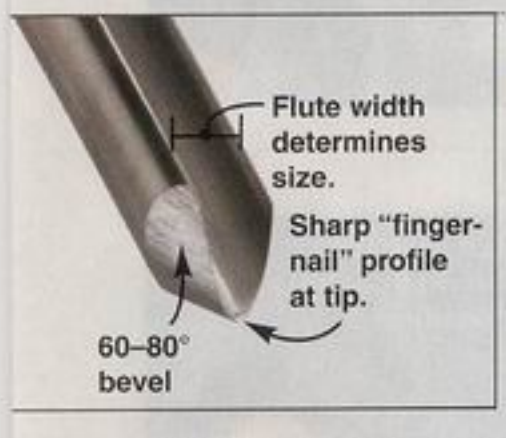
■ **Tool-rest height:** At centerline.

■ **Other uses:** Rolling small beads.



Basic function: Use the parting tool to form grooves and tenons, and to cut stock off.





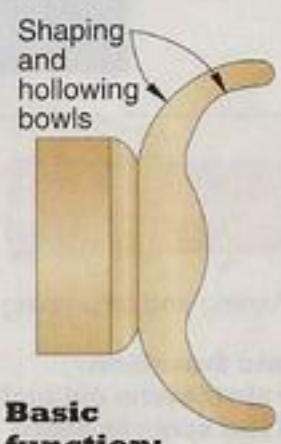
3/8" Bowl gouge

■ **Description:** This tool features a round, deep-fluted blade and a tip with a rounded or sharply pointed "fingernail" profile.

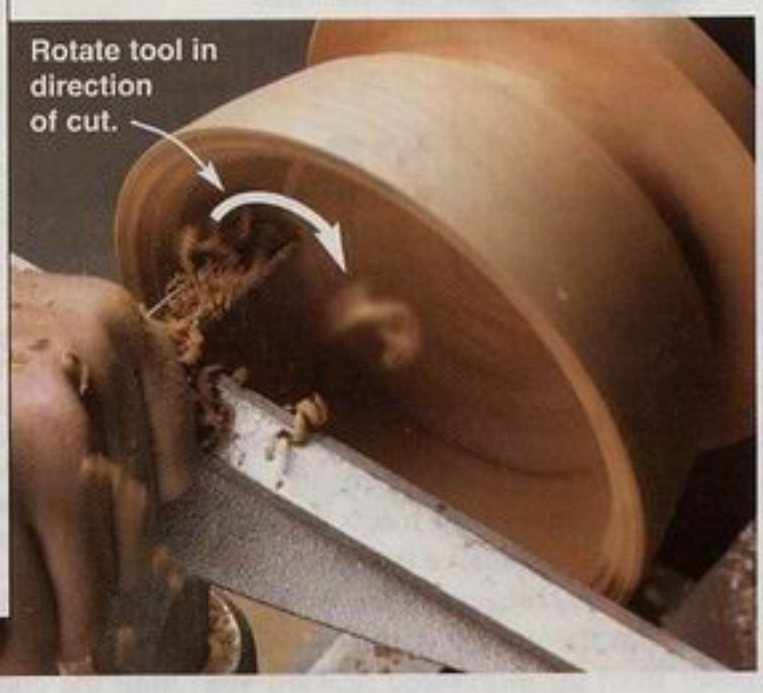
■ **Presentation and cutting:** Like other gouges, the bowl gouge's bevel should contact the workpiece first. After the cutting edge contacts the workpiece, rotate the tool in the direction of the cut and push it to shape the wood.

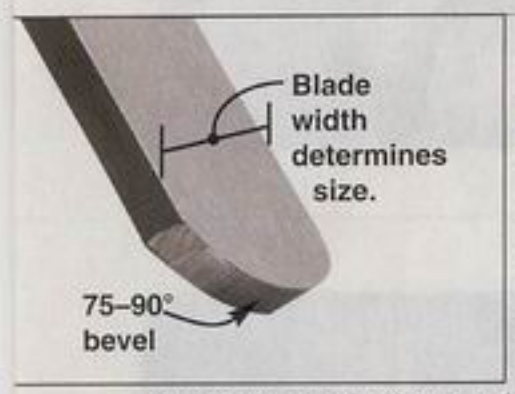
■ **Tool-rest height:** Below centerline.

■ **Other uses:** Creating ultrasmooth cuts on bowls and spindles by using as a shearing scraper.



Basic function: The bowl gouge cuts external and internal profiles on faceplate-mounted stock, such as bowls and platters.





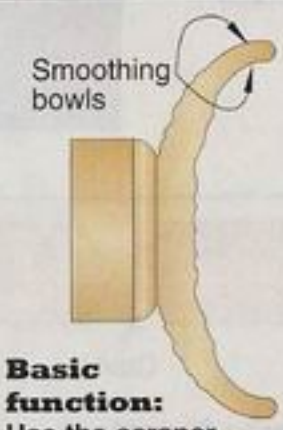
1" Roundnose scraper

■ **Description:** The scraper has a thick, flat blade with a rounded, beveled tip.

■ **Presentation and cutting:** Push the scraper into spinning stock with the longer face of the beveled blade up. The handle stays elevated slightly above the height of the cutting tip.

■ **Tool-rest height:** Below centerline on spindles, at or just above centerline on faceplate work.

■ **Other uses:** Nonaggressive smoothing.



Basic function: Use the scraper for nonaggressive shaping of spindles and bowls, and to smooth without removing much stock.

Written by **David Stone** with **Phil Brennion**

divide and organize

Customize drawer storage with this simple tray.

Don't rely on flimsy plastic trays to keep the contents of your drawers in order. With a few simple tablesaw setups, you can build a custom organizer that maximizes the space in any drawer.

Cut your stock to size

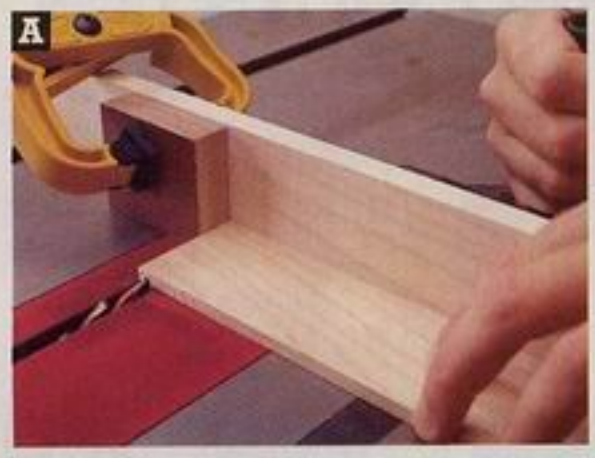
1 Measure the inside dimensions of the drawer where the organizer will go, and subtract ⅛" from the width to determine the overall width of your organizer. Use the same rule to determine the unit's length, or make a shorter tray as desired. To determine the locations for the dividers, lay out and measure the items you want to organize. Add a little extra space for easy removal.

Note: The dimensions given in our Materials List and Exploded View are for the silverware tray shown above. *You can customize the dimensions for any drawer, and position the dividers to suit. All joinery techniques remain the same.*

2 Plane or resaw stock to ¼" thickness. We used maple to match the inside of our cabinet drawers. If you aren't equipped to thickness the lumber, you can purchase ¼" "craft wood" at most home centers and hobby shops.

3 Rip all your stock to the widths shown in **Drawing 1**. Then crosscut pieces A, B, D, and E to length. The front and back (A) and long dividers (D) are the same length (⅜" narrower than the inside width of the drawer). Also cut a few test pieces for checking your saw setups. Cut the ¼" plywood bottom panel (C) to size as well.

continued on page 104



A notched miter-gauge extension eliminates chip-out, and simplifies setting the stopblock to make identical cuts.

Create the simple joinery

1 Set your tablesaw's rip fence ⅛" from the blade and raise the blade ⅛" to cut the grooves in the front and back (A) and sides (B) where shown. These grooves receive the bottom panel (C) and are sized to match its thickness. To do this, make a pass on each front, back, and side piece, and on a test piece. Nudge the fence away from the blade and make a second pass on the test piece to widen the groove. Check the fit of the bottom panel and readjust the fence as necessary. Once the setup is correct, make a second pass on each front, back, and side piece.

2 Position your miter gauge in the left-hand miter-gauge slot. Now attach an auxiliary extension to the miter gauge so that it extends several inches past the blade. With the blade still set at ⅛", make a pass to cut a notch in the extension.

3 Clamp a stopblock to the extension ⅛" to the right of the notch. Place one of your test pieces against the stopblock and cut a dado as shown in **Photo A**. It should match the dimensions shown in **Drawing 1a**. Once the setup is correct, dado the inside face of each side (B). Next, reposition the stopblock as needed to cut the rest of the dadoes in each side (B) and in each long divider (D) where shown.

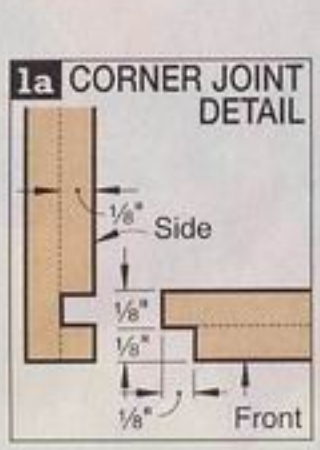
4 Reposition the stopblock against the right side of the notch in the auxiliary extension. This allows you to machine the rabbets that form tongues on the ends of the front and back (A), long dividers (D), and short dividers (E). Cut a test piece first to make sure the rabbet fits the dadoes, as shown in **Drawing 1a**.

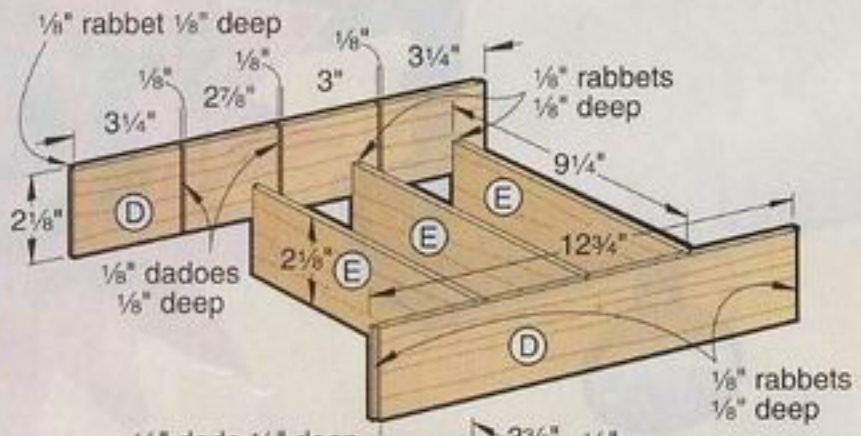
Glue up, and add finish

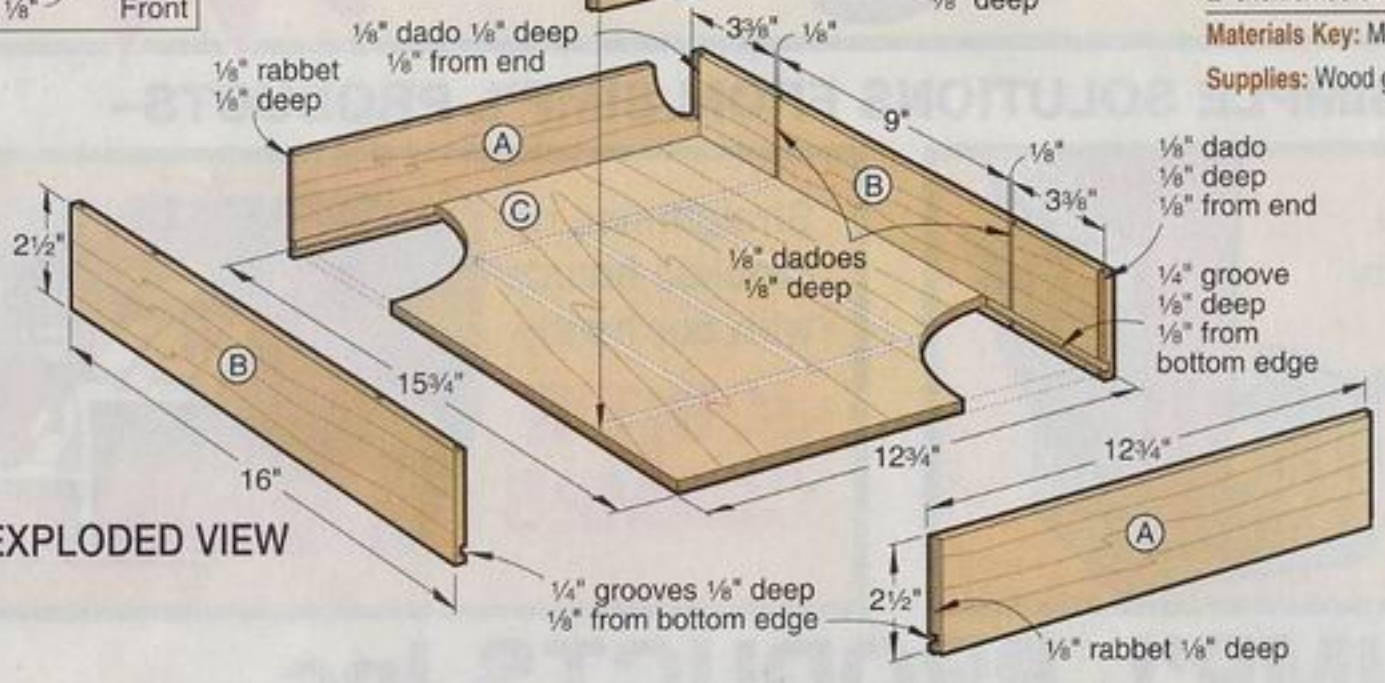
1 Assemble the front and back (A), sides (B), and bottom panel (C). To do this, spread glue on the mating tongues and dadoes, and in the bottom groove. Then join the front and back with one side. Now slip the bottom panel in place, position the other side, and clamp the assembly.

You can slide the dividers in dry, which allows you to remove them for easier cleaning or if your storage needs change. Or glue the dividers in permanently.

2 After the glue sets, ease the sharp edges with sandpaper and sand any uneven joints flush. Finally, apply a couple coats of clear finish.







1 EXPLODED VIEW

materials list

Part	FINISHED SIZE T	W	L	Matl.	Qty.
A front and back	¼"	2½"	12¾"	M	2
B sides	¼"	2½"	16"	M	2
C bottom panel	¼"	12¾"	15¾"	MP	1
D long dividers	¼"	2⅛"	12¾"	M	2
E short dividers	¼"	2⅛"	9¼"	M	3

Materials Key: M–maple; MP–maple plywood.

Supplies: Wood glue, finish.

Written by **David Stone** with **Chuck Hedlund**
Project design: **Kevin Boyle**
Illustrations: **Roxanne LeMoine**; **Lorna Johnson**
Photographs: **Marty Baldwin**

the start of a great finish

He wrote *Understanding Wood Finishing*, a book that has sold more than a quarter of a million copies; he's the editor of *Finishing and Restoration* magazine; and he teaches at seminars across the United States. So who better than **Bob Flexner** to list some of the essentials of finishing and refinishing?

Bob operates a furniture restoration shop in Norman, Oklahoma. He became a member of *WOOD*® magazine's Woodworking Hall of Fame in 2000.

7 rules to finish by

- There are only three tools used to apply finishes: Spray guns, brushes, and rags. You can use any one of these tools with any type of finish.
- Products sold as "sanding sealers" don't seal the wood any better than the first coat of any finish. Sanding sealers just make sanding easier.
- Dye dissolves, so it penetrates into the wood everywhere the liquid does. Pigment suspends and settles, so pigmented stain lodges only in pores and scratches that are big enough to hold it.
- The thinner you make any finishing product, the easier it is to apply. But thinning reduces the film build, so you might have to apply an extra coat or two.
- The basic rule for using a spray gun: Keep the gun moving while the trigger is pulled. (Pull the trigger before you swing the gun over the wood, and release it after passing the other edge.)
- Finishes bond to one another in two ways: chemical and mechanical. Chemical bonding occurs when the applied coat dissolves into the existing coat of the same, or similar, type of finish. For example, thinned lacquer will dissolve into lacquer or shellac. Mechanical bonding is made possible by scuffing a surface with an abrasive; it's required when the new coat is not likely to dissolve into the existing surface. Varnish needs to be scuffed before you add another type of finish, or even another coat of varnish, if the original coat has had time to cure thoroughly.
- A finished or painted surface must be clean and dull for successful recoating. Clean it with soap and water; clean it further and dull it by rubbing with steel wool or sandpaper or washing with tri-sodium phosphate (TSP), ammonia, or alcohol.

Keys to varnishing success

- Varnish in a different room than the one where you sand, if possible. Otherwise, let the dust settle, then wet-mop the floor so that you don't kick it up again.
- Hit the brush against your hand to knock out any loose bristles.
- Wipe the wood with a tack cloth just before you start brushing on the varnish.
- Whenever possible, reposition the piece as you work so that the area you're varnishing is horizontal. Varnish the most important surface (usually the top) last.
- If you have trouble with air bubbles remaining in the finish and not popping out, thin your varnish with 10 percent to 20 percent mineral spirits.
- Always position your workpiece so that light bounces off the surface toward you, so you can see any runs, sags, or other flaws, and remove them as you work.

Staining secrets

- Stains that clean up with water are water-based; they'll raise the grain of the wood. Before applying them, wet the wood, let it dry overnight, and sand it lightly with fine, used sandpaper.
- Use gel stains to reduce splotching on such woods as pine, birch, and cherry.
- If a piece includes both plywood and solid wood, stain samples of both to check the color. Veneered plywood usually turns out lighter because the glue under the veneer blocks deep penetration, so it needs more stain to match the solid wood.

The truth about oil

- Be sure to wipe off the excess after applying oil to the wood. That step is especially important when you use straight linseed oil or straight tung oil—they cure slowly and stay soft.
- Many "oil" finishes are varnish thinned with mineral spirits, and more accurately are called "wiping varnish." Some are blends of oil and varnish. Choose a wiping varnish if you want to build a glossy finish; choose an oil/varnish blend to produce a satin look with little build.
- To figure out which type you have, pour a small amount on a piece of glass and let it start to cure overnight. An oil/varnish blend will appear wrinkled the next day; a wiping varnish will be smooth.

shop-proven products

These woodworking wares passed our shop trials

Milwaukee enters 15-amp router arena

A year after the successful launch of the innovative 1¾-hp, fixed-base Bodygrip routers (see the test report in issue 138, page 84), Milwaukee Electric adds a 3½-hp fixed-base router to its lineup. The big router lacks the hand-around-the-motor gripping surface, but other than that the new 5625-20 is a high-powered knockoff of its little brother. And that's a high compliment.

As on the 1¾-hp model, the depth-setting system of the 5625-20 consists of a heavy-duty Acme-threaded screw for fine adjustments, and a spring-loaded quick release for large adjustments. When it's mounted in a table, you can set the cutting depth from above the table thanks to the included T-shaped wrench and a hole in the router's base. One small beef on this subject: Mounting the router with the wrench-access hole out front (where the fence won't cover it) puts the power switch at the back. A remote-start switch remedied this inconvenience for me.

The 15-amp, variable-speed, soft-start motor uses electronic feedback circuitry to maintain bit speed, even when the going gets tough. I took full-depth cuts in red oak using a raised-panel bit with back cutters, and the 5625-20 barely flinched.

This router has other thoughtful touches as well. Wide-spread, comfortable, pistol-grip handles (shown in the photo at *right*) gave me great control of the machine in handheld operations; a pair of mushroom-shaped handles also comes with the router if you prefer that style or need to work in tighter spaces than the pistol-grip handles allow. Also, Milwaukee includes two clear Lexan subbases—one with a 2½" bit opening and a second that fits Porter-Cable-style guide bushings.

—Tested by Randy Zimmerman

Milwaukee 5625-20 router

Performance	★★★★★
Price	$350
Value	★★★★☆

Call Milwaukee Electric Tool at 800/414-6527, or visit www.mil-electric-tool.com.

Kreg's new clamps speed assembly

It's easy to get hooked on pocket-hole joinery: The joints produced are tight, fast, simple, and nearly clamp-free. In fact, you only need to hold the work-pieces in alignment long enough to drive a couple of screws. Craig Sommerfeld, inventor of the Kreg Jig that popularized pocket-hole joinery, has two new clamps to make that process even faster.

The Universal Bench Klamp is a ¼×10×10" solid steel plate you recess into your assembly table. The removable locking-plier style clamp locks into a key-hole slot in the center of the plate. Because the plate serves as the bottom jaw and is flush with the tabletop, I simply positioned the joint under the jaw, and clamped it with one hand.

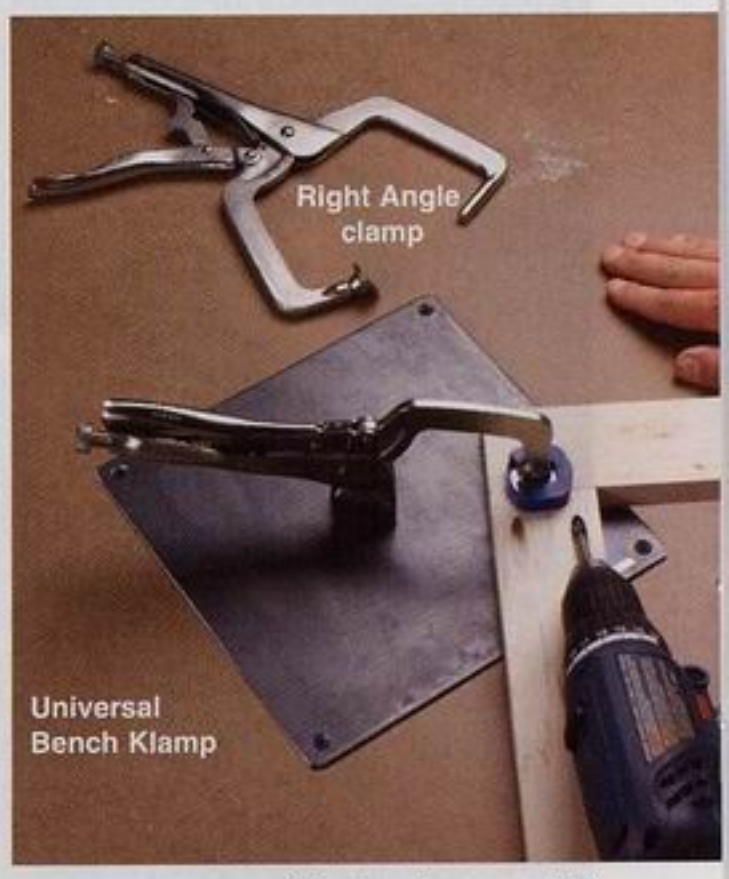
Kreg's Right Angle clamp makes end-grain to face-grain butt joints (such as the corners of a drawer) easy to clamp. One jaw is actually a pin that fits perfectly into a pocket hole. In the case of the drawer joint, you insert this pin into one of the pocket holes you drilled in the drawer side, position the other jaw on the outside of the drawer front, then close the clamp to pull the pieces together. After driving the first screw, you remove the clamp and drive the second screw.

—Tested by Dave Campbell

Kreg Universal Bench Klamp and Right Angle clamp

Performance	★★★★★
Price	$40, Bench Klamp; $25, Right Angle clamp
Value	★★★★★

Call Kreg Tools at 800/447-8638, or visit www.kregtool.com.



Continued on page 110

CD-ROM index locates articles

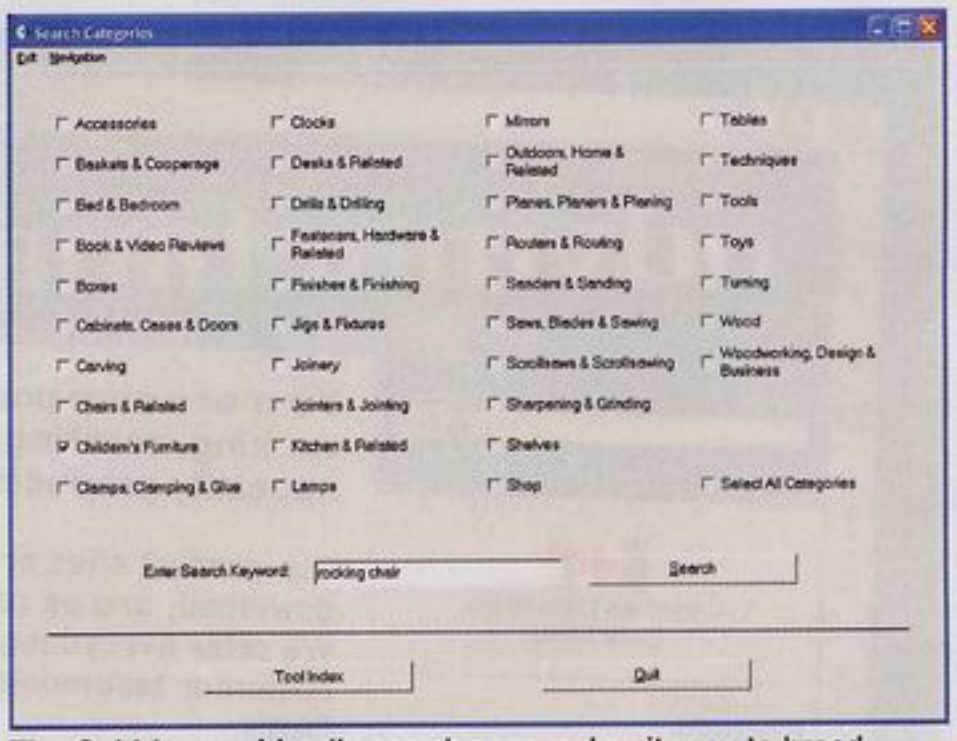
When you saw that plan for a child's rocking chair years ago, you didn't have a grandchild on the way. Now, you find yourself staring at a closet full of woodworking magazines wondering if you can find the article, much less build the project, before the baby comes. Not to worry. If you have a personal computer running Windows 95 or higher, *Woodworker's Guide* CD-ROM will find the plans.

Organized into 37 subject categories, this software helps you find a project even if you don't know exactly what you're looking for. I selected the Children's Furniture category, searched for "rocking chair," and the screen showed me where to find a dozen plans.

But it's more than just project plans. *Woodworker's Guide* lists virtually every project, tool review, and technique story that has appeared in 26 different woodworking-related magazines. You can even set up a filter that searches only the magazines you have in your collection. And to help locate tool info, a built-in search engine looks for product reviews by manufacturer, tool, model number, or any combination of the three.

By its very nature, any such listing of periodicals becomes outdated quickly. But you can keep listings up to date by downloading annual updates, for a fee, from the index's Web site.

For people without a Windows-based computer, a book version of *Woodworker's Guide*, called *The Guide to Published Woodworking Plans and Techniques*, contains all of the same information as the CD-ROM, organized by category. Volume 1 indexes magazines through 1999; Volume 2 comes out every year and includes all woodworking articles published since Volume 1.



The *Guide*'s user-friendly search page makes it easy to broaden or narrow your search by choosing the categories.

—*Tested by Dave Campbell*

Woodworker's Guide CD-ROM

Performance	★★★★★
Price	CD-ROM, $35 ; Books (Vols. 1 & 2), $56; annual updates, $17
Value	★★★☆☆

Call Woodworkers Indexing at 610/558-3397, or visit www.woodworkersindexing.com.

Continued on page 112

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Best doweling jig we've ever used

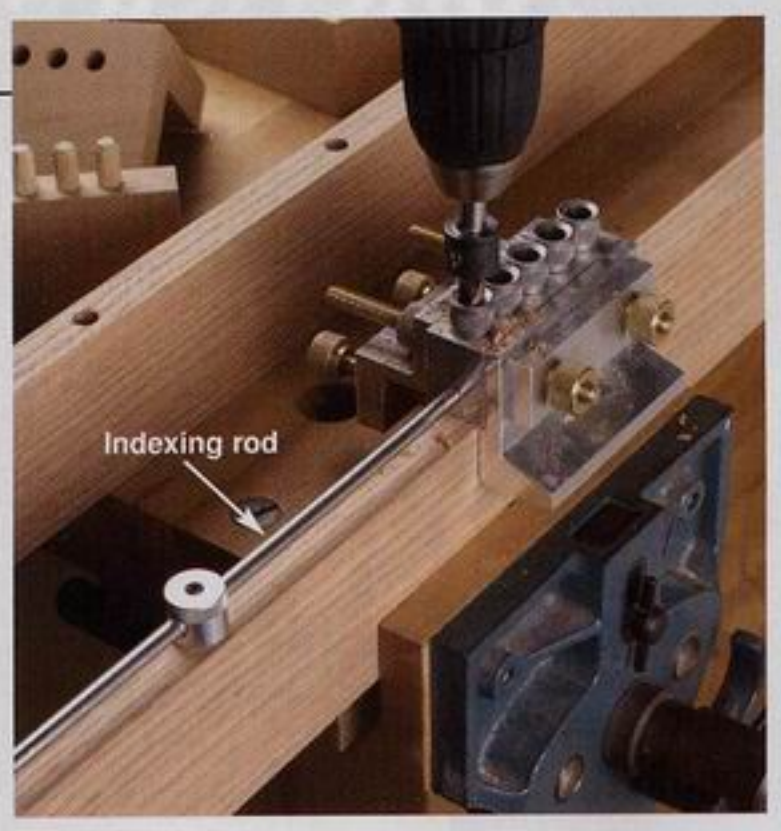
I've tried lots of doweling jigs over the years, which is why I'm a big fan of biscuit joinery. Biscuit joints give me a little wiggle room to account for slight inaccuracies, whereas dowel joints are notoriously hard to line up and leave absolutely no margin for error. The Dowelmax doweling jig, though, is dead-on accurate and a breeze to use.

For one thing, the five hardened-steel drill guides in the Dowelmax are precisely spaced equidistant from each other and both sides and ends of the jig. That makes the jig completely reversible with no loss of accuracy. And orienting Dowelmax on your workpiece is nearly idiot-proof: Simply mark the stock faces that need to be flush, and install the jig making sure the marked faces match the check-marked sides of the jig.

Dowelmax really shines when it comes to edge-gluing long workpieces with multiple dowels, thanks to its indexing rod and pin that apply step-and-repeat accuracy to dowel holes. For closely spaced holes, slide the jig down so its first hole lies over the last hole you drilled, drop the pin in the first hole, and drill more holes. For wider spacing, insert the indexing rod between the last hole drilled and the jig, as shown at *right*. In my tests, the resulting dowel holes lined up perfectly.

The Dowelmax kit also includes slotted spacers for working different thicknesses of stock (the jig automatically centers on ¾" stock) or to offset the dowels in a workpiece. The kit doesn't come with a drill bit, but I'd spring an extra $6 for the 9.7mm bit—it's a great fit for ⅜" dowels and doesn't leave the joint glue-starved. A ⅜" bit also works with the guides, but it fits the dowels too tightly for my liking.

—Tested by George Granseth



Dowelmax

Performance	★★★★★
Price	$140, kit; $110, jig only
Value	★★★★☆

Call OMS Tool Co. at 877/986-9400, or visit www.dowelmax.com.

Continued on page 116

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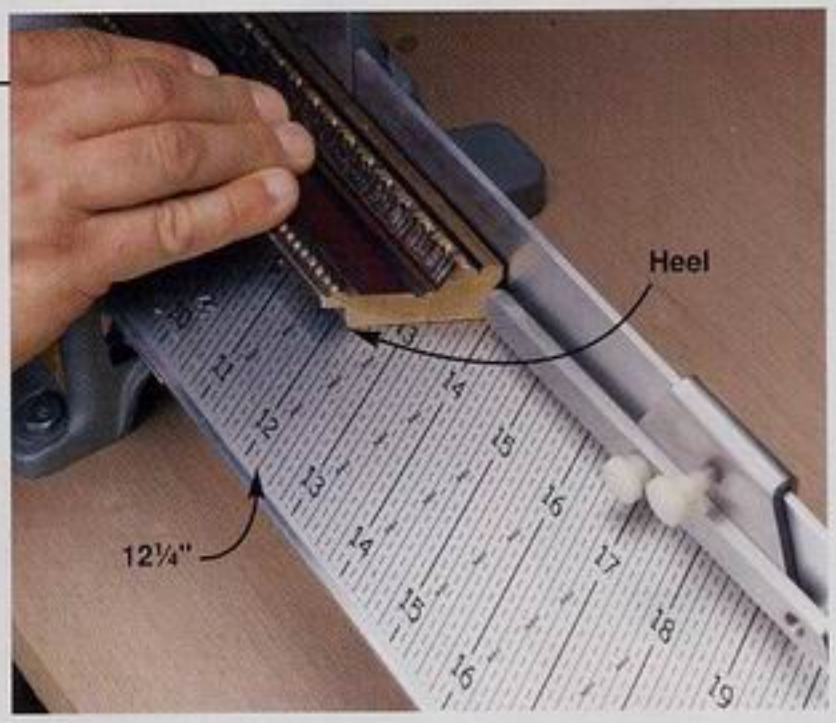
Template and stop for dead-on miters

If you've ever made a frame to fit around something—whether it be a photo, a piece of matted artwork, or a mirror—cutting the frame pieces to the right length can drive you nuts. You know what the inside dimension needs to be, but you can't set a stop for the heel (short dimension of a mitered piece) on your mitersaw or tablesaw miter gauge because of the angle.

Make-A-Frame Mitersaw Extension solves the dilemma with durable Mylar templates that let you measure accurately from the heel of a miter cut. The interchangeable templates for 4-, 6-, or 8-sided frames attach to the supplied aluminum extension with a couple of short pieces of double-faced tape. The first time you use a new template, you need to calibrate it to your saw, but it's a simple task and the templates aren't damaged by removing them from the extension.

Once the template is calibrated to your saw, you simply make the first miter cut, then rotate the frame piece end for end and align the miter's heel with the graduation on the template for your short dimension (12¼" to the inside of the rabbet as shown in the photo at *right*). Slide the length stop up against the workpiece, and you now have an accurate, repeatable measurement for cutting perfectly matching frame sides. The templates work for frame pieces up to 42" long and 3¾" wide.



Even if you don't make a lot of frames, the extruded aluminum Make-A-Frame Mitersaw Extension makes a great work support for your mitersaw. The somewhat crude but effective installation requires drilling holes in your saw's base to bolt on the hinge that connects the extension to the saw. An adjustable foot on the outboard end of the 3'-long extension levels it to your mitersaw's table.

—Tested by Garry Smith

Make-A-Frame Mitersaw Extension

Performance	★★★★☆
Price	$90 plus shipping
Value	★★★☆☆

Call Wood Creations of Central Florida at 407/886-3577, or e-mail woodcreationsfl@aol.com.

Continued on page 119

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Tilting support won't tumble

If you've ever had an outfeed roller stand tip over when ripping long stock on your tablesaw, you'll love the tilting table of Ridgid's AC9933 Flip Top Portable Work Support. It defeats the usual culprits in such accidents: a roller stand that's set a bit too high, or a sagging workpiece that hangs too low when it comes off the saw.

You still need to set the tabletop height to match your work-surface height. But unlike a roller stand, the AC9933's large pivoting tabletop, shown in the photo at *right*, rests at an angle, so when a sagging workpiece bumps into it, the table tilts to flat, gently guiding it to the proper height. When you need a fixed horizontal work surface, say for stock support on a drill-press table, the tilting top also locks into a flat orientation. The tabletop height is adjustable from 27" to 45".

I found the AC9933 stable in my testing, as its large 20¾×25" footprint makes it less tippy to begin with and less prone to wobble caused by a slightly uneven floor. That quality was especially evident when I used it as an infeed support when ripping sheet goods. The extra weight-bearing surface of the 21×7½" tabletop, plus the tilting function, made it much easier to position a sheet of plywood for ripping on the tablesaw. And with no rollers to inadvertently "steer" the sheet, I felt like I was always in control.

Although it weighs only 11 pounds, the AC9933 is no lightweight: It's rated to hold 250 pounds. It folds to only 3½" flat for storage.

—Tested by John Cebuhar

Ridgid Flip Top Portable Work Support (model AC9933)

Performance	★★★★★
Price	$30
Value	★★★★★

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what's ahead

Coming up in the June/July issue of *WOOD*® magazine **on sale May 20**

Fantastic furniture and shop jigs . . .

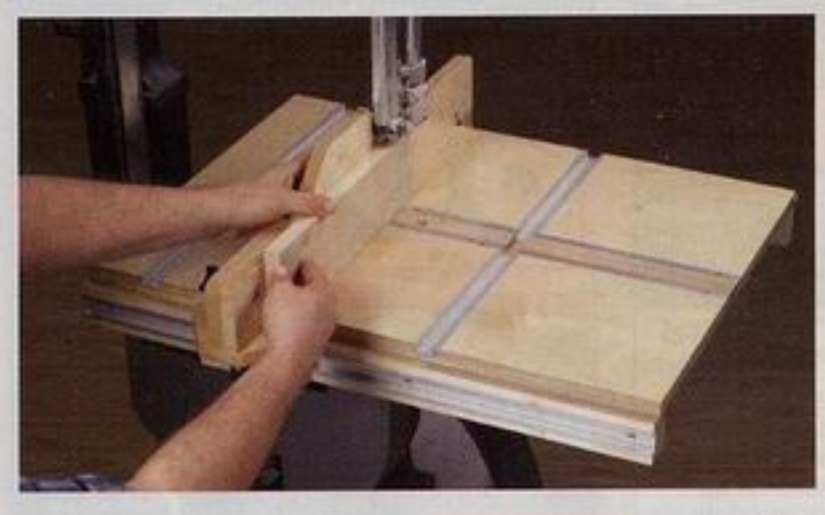
COVER PROJECT

Classic barrister's bookcase

Think modular furniture is a new thing? Stackable bookcases with flip-up glass doors have been around for a long time. Our handsome oak version goes together in a jiffy.

Adirondack chair and footrest

Add style and comfort to your outdoors with this easy project. It matches the popular settee in the August 2000 issue (no. 125).



Ultimate bandsaw jig

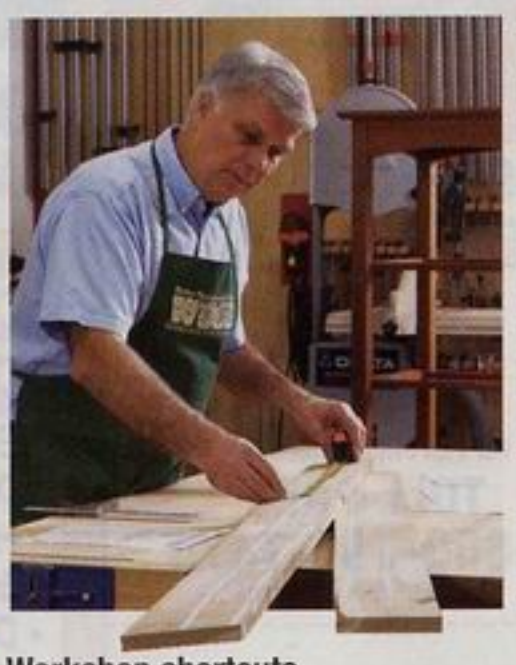
Unleash your bandsaw's potential for resawing, tapering, circle cutting, large-stock handling, and pattern cutting with this do-it-all jig.

...and the tools and tips for making them

TOOL TEST

Plunge router roundup

We put seven of today's latest 1¾- to 2-hp plunge routers through a battery of shop tests to uncover the best performer.



Workshop shortcuts

Discover the best tricks used by *WOOD* magazine's Master Craftsman, Chuck Hedlund, that guarantee better woodworking in less time.

Secrets to success with sheet goods

Learn how today's newest plywoods and other "engineered" sheet goods help you get better results in the workshop.

Low-cost, super-simple sharpening

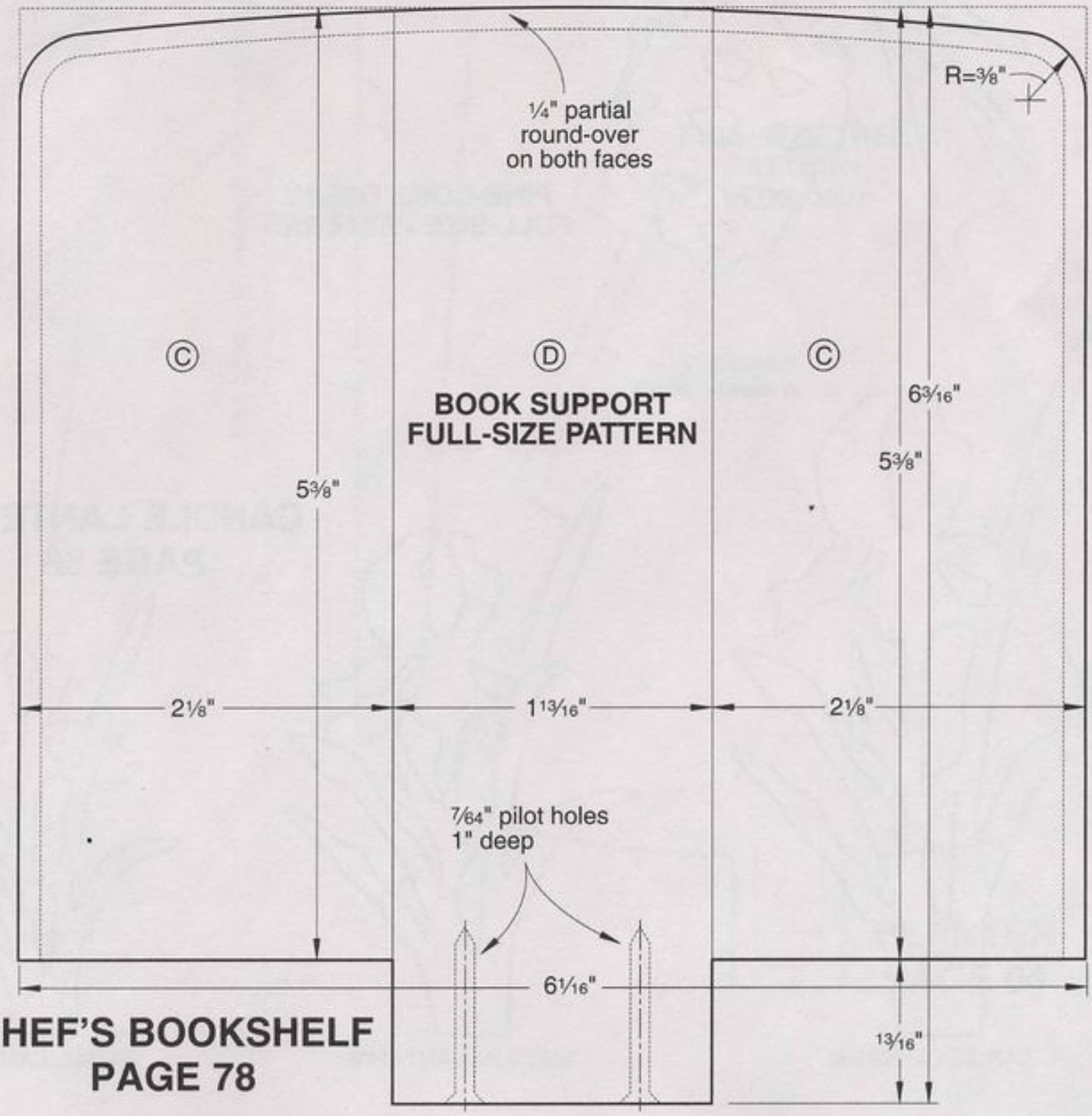
Your chisels and plane irons will slice through wood effortlessly using only sandpaper, a simple jig, and cleansing powder to hone them.

Better Homes and Gardens®
WOOD® PATTERNS®
May 2003 For your woodworking convenience ***Issue 148***

Dear Reader: As a service to you, we've included full-size patterns on this insert for irregular-shaped and intricate project parts. You can machine all other project parts using the Materials List and the drawings accompanying the project you're building.

TABLE LAMP Page 58
CANDLE LANTERN Page 66
CHEF'S BOOKSHELF Page 78
PLANTER 94

GRAB LIFE BY THE HORNS
DODGE



CHEF'S BOOKSHELF
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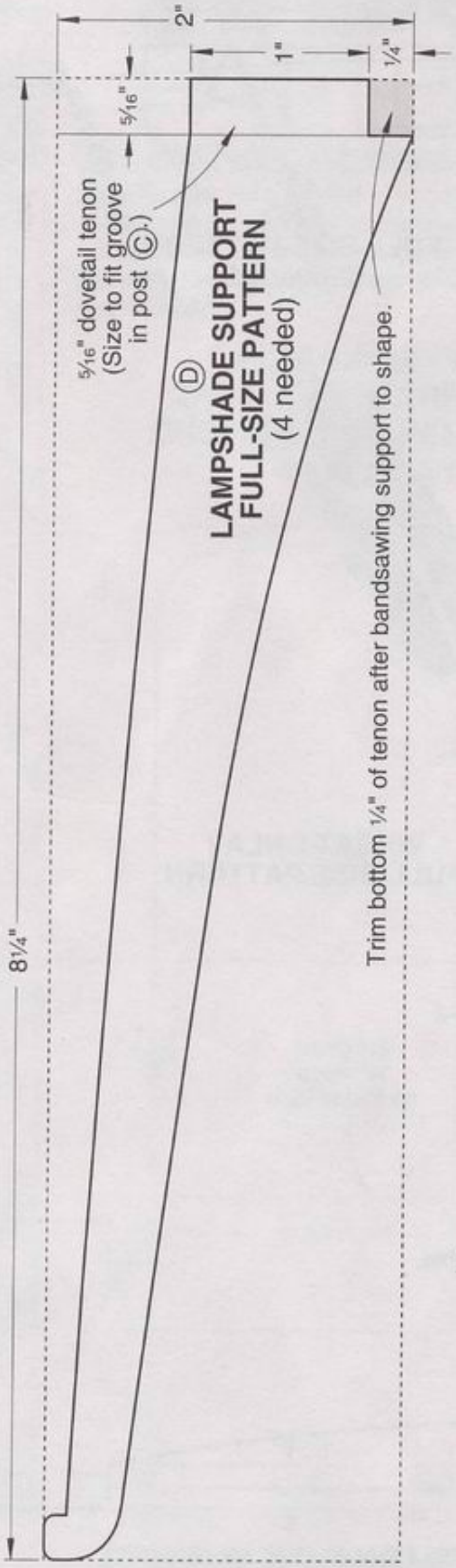

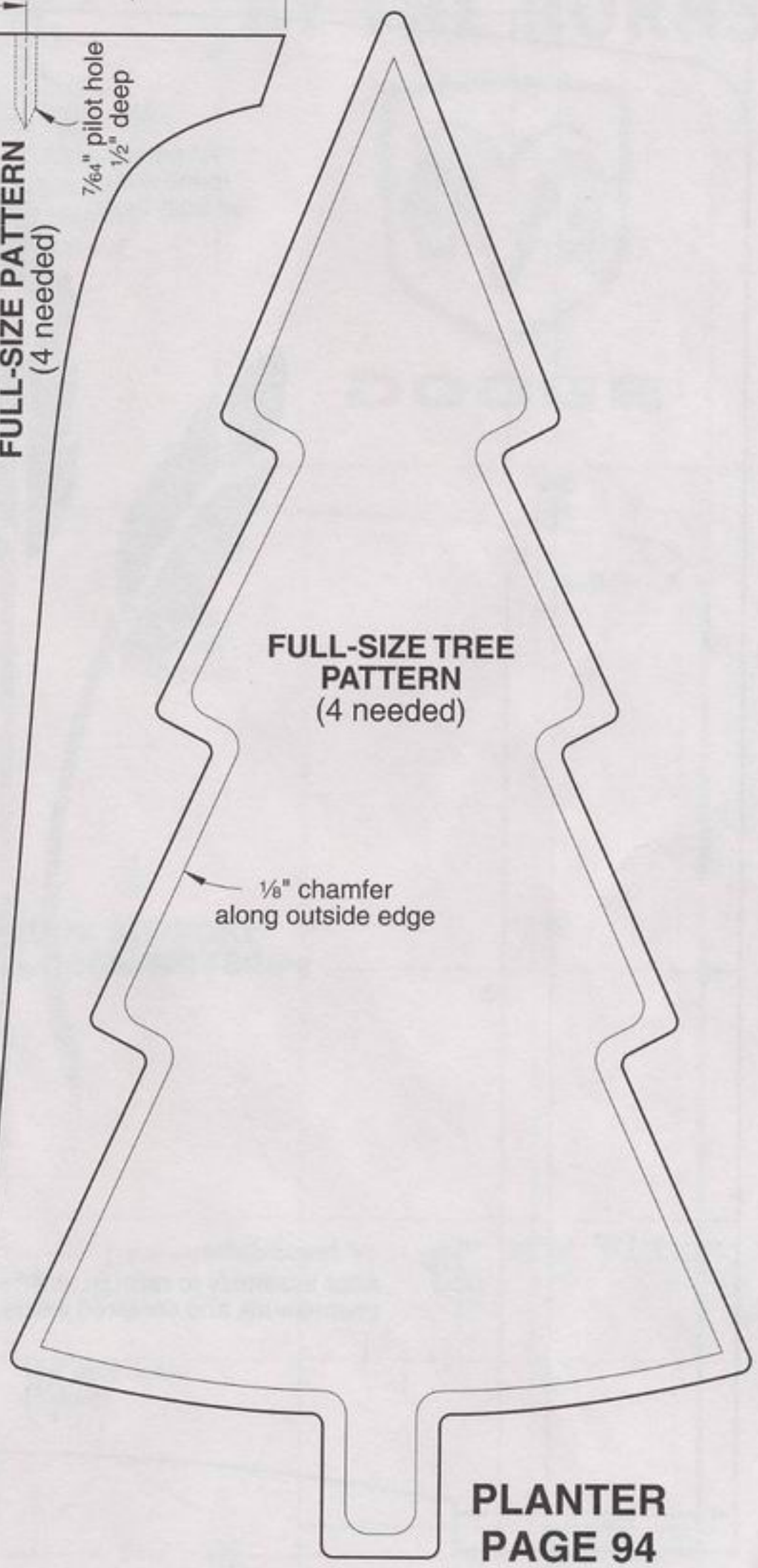

PLANTER
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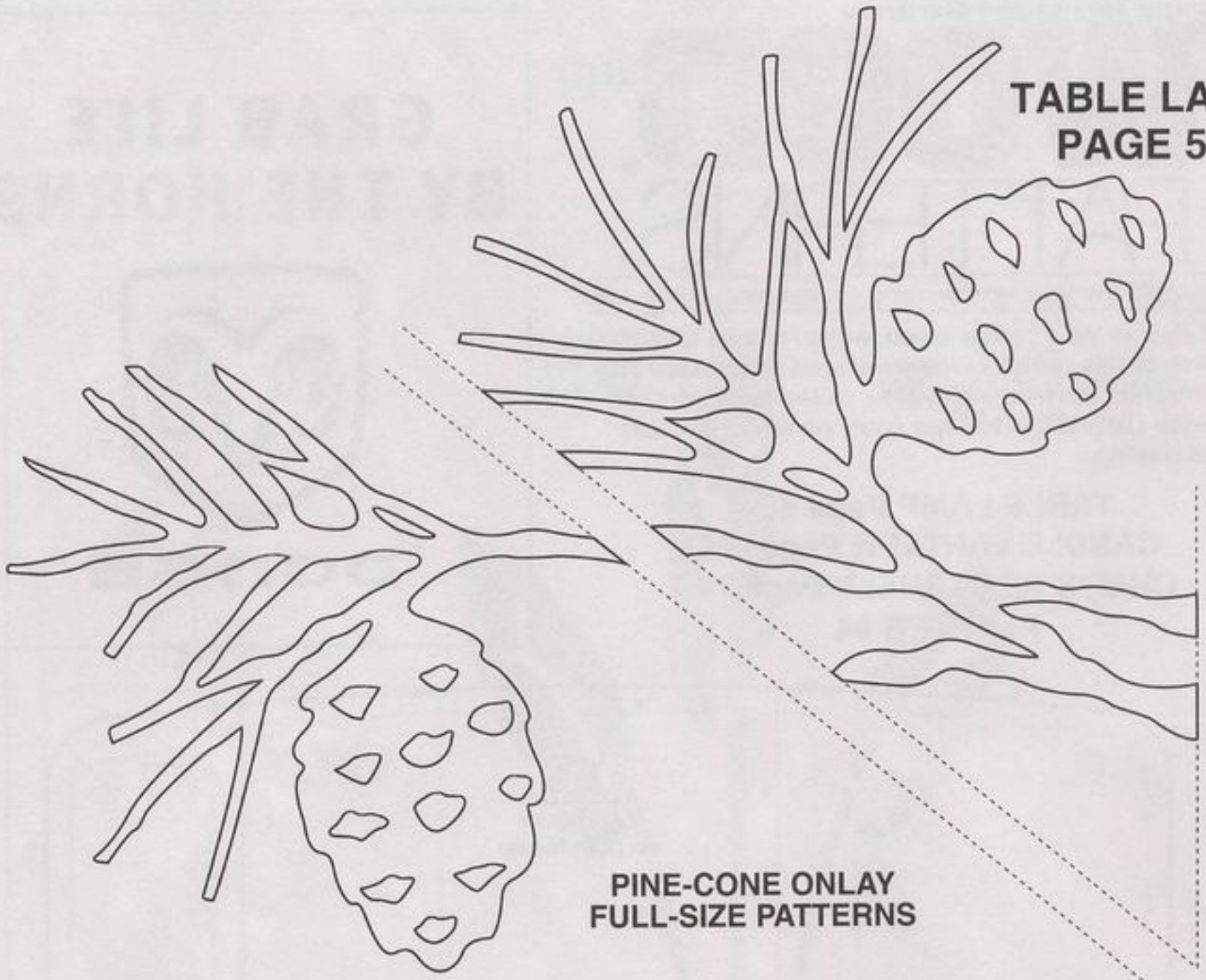
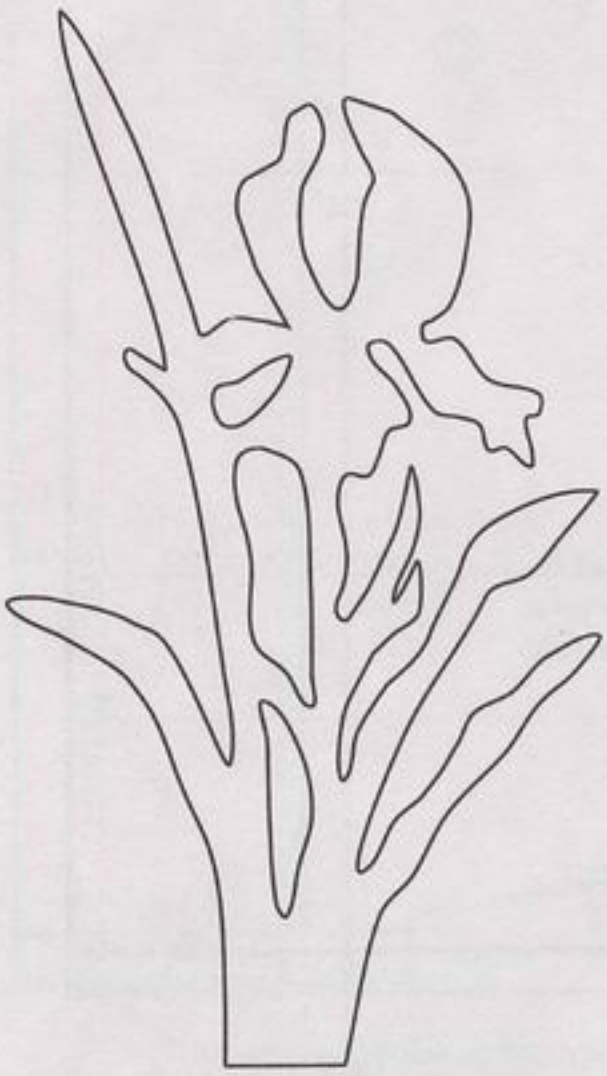
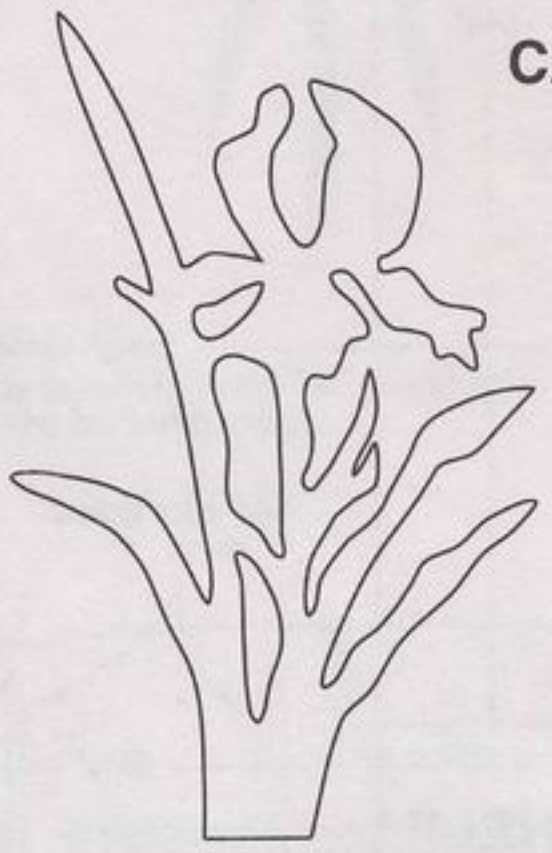


PINE-CONE ONLAY
FULL-SIZE PATTERNS

CANDLE LANTERN
PAGE 66



LARGE LANTERN



MEDIUM LANTERN

SMALL LANTERN

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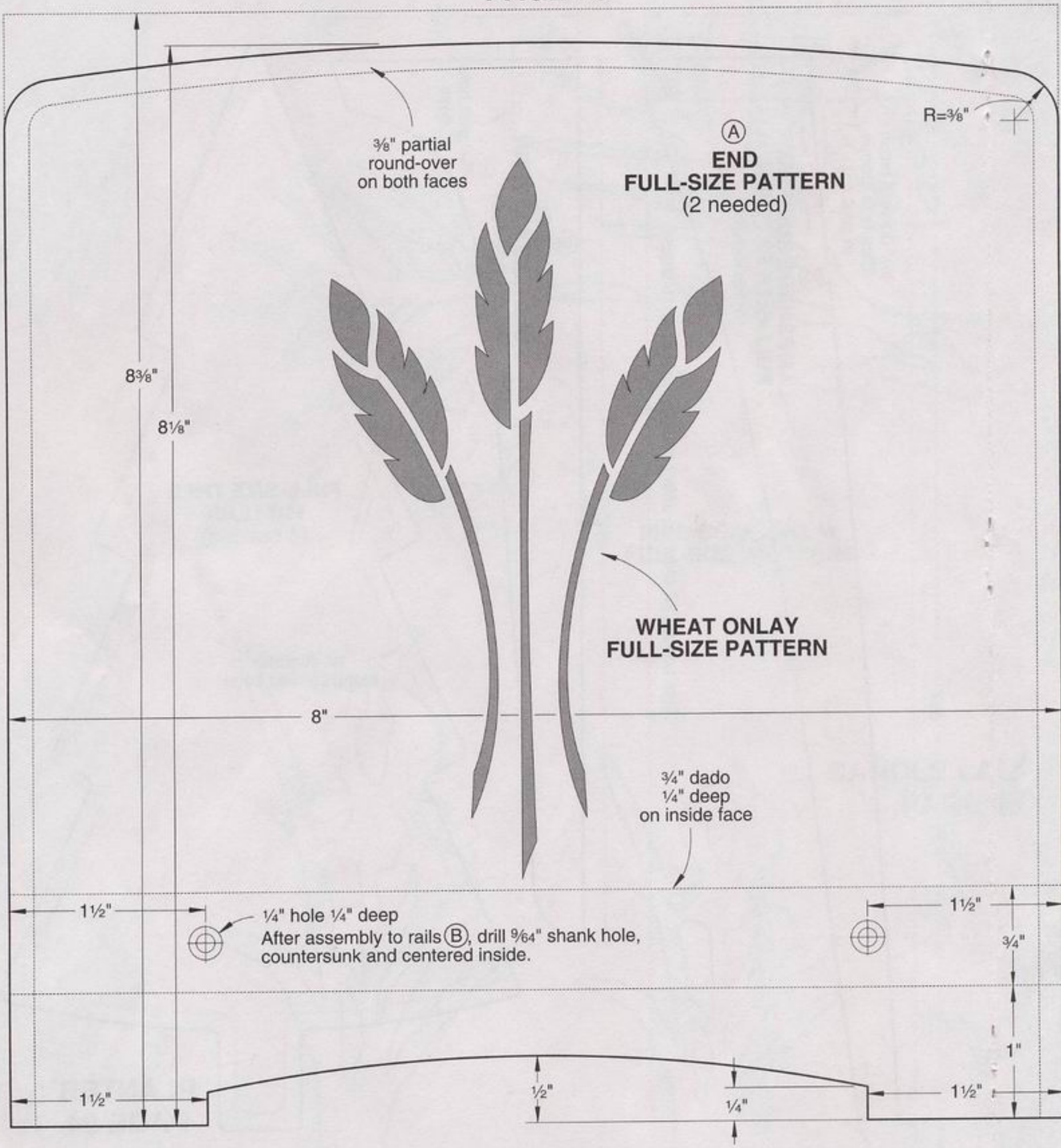

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